

Company: Itron, Inc.

Test of: NIC 510-06

To: FCC CFR 47 Part 15 Subpart C 15.247 (DTS)

Report No.: ITRO01-U3 Rev A

COMPLETE TEST REPORT





Test of: Itron, Inc. NIC 510-06

To: FCC CFR 47 Part 15 Subpart C 15.247 (DTS); IC RSS-247

Test Report Serial No.: ITRO01-U3 Rev A

This report supersedes: NONE

Applicant: Itron, Inc.
230 West Tasman Drive
San Jose, California 95134
USA

Product function: Plug in Radio Device

Issue Date: 9th May 2018

This Test Report is Issued Under the Authority of:

MiCOM Labs, Inc.
575 Boulder Court
Pleasanton California 94566
USA
Phone: +1 (925) 462-0304
Fax: +1 (925) 462-0306
www.micomlabs.com



MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

Table of Contents

1. ACCREDITATION, LISTINGS & RECOGNITION	5
1.1. TESTING ACCREDITATION.....	5
1.2. RECOGNITION	6
1.3. PRODUCT CERTIFICATION	7
2. DOCUMENT HISTORY	8
3. TEST RESULT CERTIFICATE	9
4. REFERENCES AND MEASUREMENT UNCERTAINTY	10
4.1. Normative References	10
4.2. Test and Uncertainty Procedure	11
5. PRODUCT DETAILS AND TEST CONFIGURATIONS	12
5.1. Technical Details	12
5.2. Scope Of Test Program	13
5.3. Equipment Model(s) and Serial Number(s)	15
5.4. Antenna Details	15
5.5. Cabling and I/O Ports	15
5.6. Test Configurations.....	16
5.7. Equipment Modifications	16
5.8. Deviations from the Test Standard	16
6. TEST SUMMARY	17
7. TEST EQUIPMENT CONFIGURATION(S)	18
Conducted	18
Radiated Emissions - 3m Chamber.....	20
AC Wireline Emissions	22
8. MEASUREMENT AND PRESENTATION OF TEST DATA	24
9. TEST RESULTS	25
9.1. 6 dB & 99% Bandwidth	25
9.2. Conducted Output Power	27
9.3. Power Spectral Density	29
9.4. Emissions	31
9.4.1. <i>Conducted Emissions</i>	31
9.4.1.1. Conducted Spurious Emissions	31
9.4.1.2. Conducted Band-Edge Emissions	34
9.4.2. <i>Radiated Emissions</i>	36
9.4.2.3. TX Spurious & Restricted Band Emissions	36
<i>Integral Antenna (Tai Sheng Chen 155-0010-00)</i>	39
<i>OMNI Antenna (WPANT30017-CA)</i>	45
<i>Wrap Antenna (WPANT40020-SA)</i>	51
9.4.3. <i>Digital Emissions (0.03 - 1 GHz)</i>	57
9.4.4. <i>AC Wireline Emissions</i>	64
A. APPENDIX - GRAPHICAL IMAGES	66
A.1. 6 dB & 99% Bandwidth	67
A.2. Power Spectral Density	70
A.3. Emissions	76
A.3.1. <i>Conducted Emissions</i>	76
A.3.1.1. Conducted Spurious Emissions	76
A.3.1.2. Conducted Band-Edge Emissions	79
A.3.2. <i>Radiated Emissions</i>	81
<i>Integral Antenna (Tai Sheng Chen 155-0010-00)</i>	81

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 4 of 101

<i>OMNI Antenna (WPANT30017-CA)</i>	87
<i>Wrap Antenna (WPANT40020-SA)</i>	93
<i>A.3.3. Digital Emissions (0.03 - 1 GHz)</i>	99

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

1. ACCREDITATION, LISTINGS & RECOGNITION

1.1. TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard ISO/IEC 17025:2005. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-01.pdf>



This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

1.2. RECOGNITION

MiCOM Labs, Inc has widely recognized wireless testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA countries. MiCOM Labs test reports are accepted globally.

Country	Recognition Body	Status	Phase	Identification No.
USA	Federal Communications Commission (FCC)	TCB	-	US0159 Listing #: 102167
Canada	Industry Canada (IC)	FCB	APEC MRA 2	US0159 Listing #: 4143A-2 4143A-3
Japan	MIC (Ministry of Internal Affairs and Communication) VCCI	CAB --	APEC MRA 2 --	RCB 210 A-0012
Europe	European Commission	NB	EU MRA	NB 2280
Australia	Australian Communications and Media Authority (ACMA)	CAB	APEC MRA 1	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)	CAB	APEC MRA 1	
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)	CAB	APEC MRA 1	
Singapore	Infocomm Development Authority (IDA)	CAB	APEC MRA 1	
Taiwan	National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI)	CAB	APEC MRA 1	
Vietnam	Ministry of Communication (MIC)	CAB	APEC MRA 1	

EU MRA – European Union Mutual Recognition Agreement.

NB – Notified Body

APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement. Recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.

Phase I - recognition for product testing

Phase II – recognition for both product testing and certification

1.3. PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard ISO/IEC 17065:2012. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-02.pdf>



Accredited Product Certification Body

A2LA has accredited

MICOM LABS

Pleasanton, CA

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 Requirements for bodies certifying products, processes and services. This product certification body also meets the A2LA R322 – Specific Requirements – Notified Body Accreditation Requirements and A2LA R308 - Specific Requirements - ISO-IEC 17065 - Telecommunication Certification Body Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a management system.

Presented this 4th day of February 2016.



President and CEO
For the Accreditation Council
Certificate Number 2381.02
Valid to May 31, 2018
Revised April 25, 2018



For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation.

United States of America – Telecommunication Certification Body (TCB)
Industry Canada – Certification Body, CAB Identifier – US0159

Europe – Notified Body (NB), NB Identifier - 2280

Japan – Recognized Certification Body (RCB), RCB Identifier - 210

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

2. DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft	16th April 2018	Draft report for client review.
Rev A	9th May 2018	Initial release.
.		
.		
.		
.		
.		

In the above table the latest report revision will replace all earlier versions.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 9 of 101

3. TEST RESULT CERTIFICATE

Manufacturer: Itron, Inc.
230 West Tasman Drive
San Jose
California 95134 USA

Model: NIC 511-0603-13

Type Of Equipment: Modular radio device

S/N's: 0013500700001592

Test Date(s): 26 March - 03 April 2018

Tested By: MiCOM Labs, Inc.
575 Boulder Court
Pleasanton
California 94566 USA

Telephone: +1 925 462 0304

Fax: +1 925 462 0306

Website: www.micomlabs.com

STANDARD(S)

FCC CFR 47 Part 15.247 (DTS); IC RSS-247

TEST RESULTS

EQUIPMENT COMPLIES

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

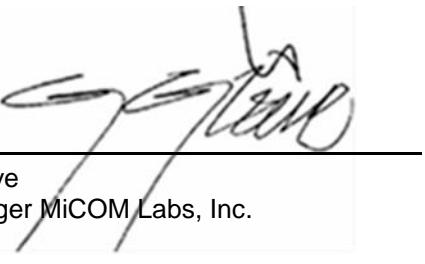
Notes:

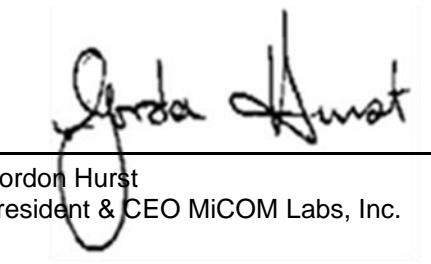
1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

Approved & Released for MiCOM Labs, Inc. by:



TESTING CERT #2381.01


Graeme Grieve
Quality Manager MiCOM Labs, Inc.


Gordon Hurst
President & CEO MiCOM Labs, Inc.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

4. REFERENCES AND MEASUREMENT UNCERTAINTY

4.1. Normative References

REF.	PUBLICATION	YEAR	TITLE
I	KDB 662911 D01 & D02	Oct 31 2013	Guidance for measurement of output emission of devices that employ single transmitter with multiple outputs or systems with multiple transmitters operating simultaneously in the same frequency band
II	KDB 558074 D01 v04	5th April 2017	Guidance for performing compliance measurements on Digital Transmission Systems (DTS) operating under section 15.247.
III	A2LA	August 2017	R105 - Requirement's When Making Reference to A2LA Accreditation Status
IV	ANSI C63.10	2013	American National Standard for Testing Unlicensed Wireless Devices
V	ANSI C63.4	2014	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
VI	ETSI TR 100 028	2001-12	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
VII	FCC 47 CFR Part 15.247	2016	Radio Frequency Devices; Subpart C – Intentional Radiators
VIII	ICES-003	Issue 6 Jan 2016; Updated April 2017	Information Technology Equipment (Including Digital Apparatus) – Limits and methods of measurement.
IX	M 3003	Edition 3 Nov.2012	Expression of Uncertainty and Confidence in Measurements
X	RSS-247 Issue 2	Feb 2017	Digital Transmission Systems (DTSs), Frequency Hopping System (FHSs) and Licence-Exempt Local Area Network (LE-LEN) Devices
XI	RSS-Gen Issue 4; Amendment 1	March 2018	General Requirements for Compliance of Radio Apparatus
XII	KDB 644545 D03 v01	August 14th 2014	Guidance for IEEE 802.11ac New Rules
XIII	FCC 47 CFR Part 2.1033	2016	FCC requirements and rules regarding photographs and test setup diagrams.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

4.2. Test and Uncertainty Procedure

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

5. PRODUCT DETAILS AND TEST CONFIGURATIONS

5.1. Technical Details

Details	Description
Purpose:	Test of the Itron, Inc. NIC 510-06 to FCC CFR 47 Part 15.247 (DTS); & IC RSS-247.
Applicant:	ITRON, INC. 230 West Tasman Drive San Jose California 95134 USA
Manufacturer:	ITRON, INC.
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Test report reference number:	ITRO01-U3 Rev A
Date EUT received:	26th March 2018
Standard(s) applied:	FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Dates of test (from - to):	26 March - 03 April 2018
No of Units Tested:	4
Product Family Name:	NIC 510-06
Model(s):	NIC 511-0603-13 NIC 511-0602-14 for USB testing
Location for use:	Indoor/Outdoor
Declared Frequency Range(s):	902 - 928 MHz;
Type of Modulation:	DTS
EUT Modes of Operation:	902 - 928 MHz:OFDM1
Declared Nominal Output Power:	902 - 928 MHz:30 dBm
Transmit/Receive Operation:	Transceiver -Half Duplex
Rated Input Voltage and Current:	4VDC
Operating Temperature Range:	-40 to +85 degrees C.
ITU Emission Designator:	OFDM: 1M21G7D
Equipment Dimensions:	110mm x 45mm x 15mm
Weight:	50 grams
Hardware Rev:	173-0870-00
Software Rev:	4.4.0

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

5.2. Scope Of Test Program

Itron, Inc. NIC 511-0603-13

The scope of the test program was to test the Itron, Inc. NIC 511-0603-13 and NIC 511-0602-14 DTS configurations in the frequency ranges 902 – 928 MHz; for compliance against the following specification:

FCC CFR 47 Part 15.247 (DTS); Radio Frequency Devices; Subpart C – Intentional Radiators

Industry Canada RSS-247

Digital Transmission Systems (DTSs), Frequency Hopping System (FHSs) and Licence-Exempt Local Area Network (LE-LEN) Devices

The following product description was provided by Silver Spring.

The NIC 510-06 is a plug-in radio device, will communicate over mesh and HAN networks. May be integrated into host devices (i.e., FSU 5.0, IOTR 5, energy meters, etc.) to be used in Itron Smart Energy Networks (SEN). NIC 510-06 may be configured for host applications on USB or Serial data communications and may support standard or extended last gasp (ELG). The NIC 510-06 family supports basic meter types including single phase meters and three phase meters.

This report is intended to cover the NIC 510-06 family of products which includes the NIC 511-0603-13 and NIC 511-0602-14 and represents a worst case configuration of the product family.

NIC 510-06 products include the following model numbers/configurations:

NIC 511-0603: 900+2.4, INT/EXT ANT, HW1
NIC 511-0602: 900+2.4, EXT ANT, HW1
NIC 511-0601: 900+2.4, INT ANT, HW1
NIC 511-0601-13 : 900+2.4, INT ANT, HW1, 75s ELG
NIC 511-0602-13 : 900+2.4, EXT ANT, HW1, 75s ELG
NIC 511-0602-13 : 900+2.4, INT/EXT ANT, HW1, 75s ELG
NIC 511-0602-14 : 900+2.4, EXT ANT, HW1, USB

ITRON, INC. NIC 511-0603-13



This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

5.3. Equipment Model(s) and Serial Number(s)

Type (EUT)	Equipment Description	Serial Number
EUT	NIC 511-0603-13 NIC 511-0602-14	0013500700001592 00135007000013D5
Support	IOTR5 SBC	Proto1

5.4. Antenna Details

Type	Manufacturer	Model	Family	Gain (dBi)	BF Gain	Dir BW	X-Pol	Frequency Band (MHz)
integral	Tai Sheng Chen	155-0010-00	f type	1.2	-	360	-	902 - 928
external	WP	WPANT30017-CA	OMNI	3.0	-	360	-	902 - 928
external	WP	WPANT40020-SA	Wrap Around	1.0	-	360	-	902 - 928
BF Gain - Beamforming Gain Dir BW - Directional BeamWidth X-Pol - Cross Polarization								

5.5. Cabling and I/O Ports

Port Type	Max Cable Length	# of Ports	Screened	Conn Type	Data Type
RS232	0, direct plug-in	1	No	12-PIN	Packet Data
USB	0, direct plug-in	1	No	4-PIN	Packet Data

5.6. Test Configurations

Results for the following configurations are provided in this report:

Operational Mode(s)	Data Rate with Highest Power kbp/s	Channel Frequency (MHz)		
		Low	Mid	High
902 - 928 MHz				
OFDM	2400	903.2	914.0	926.0

5.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. NONE

5.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. NONE

6. TEST SUMMARY

List of Measurements

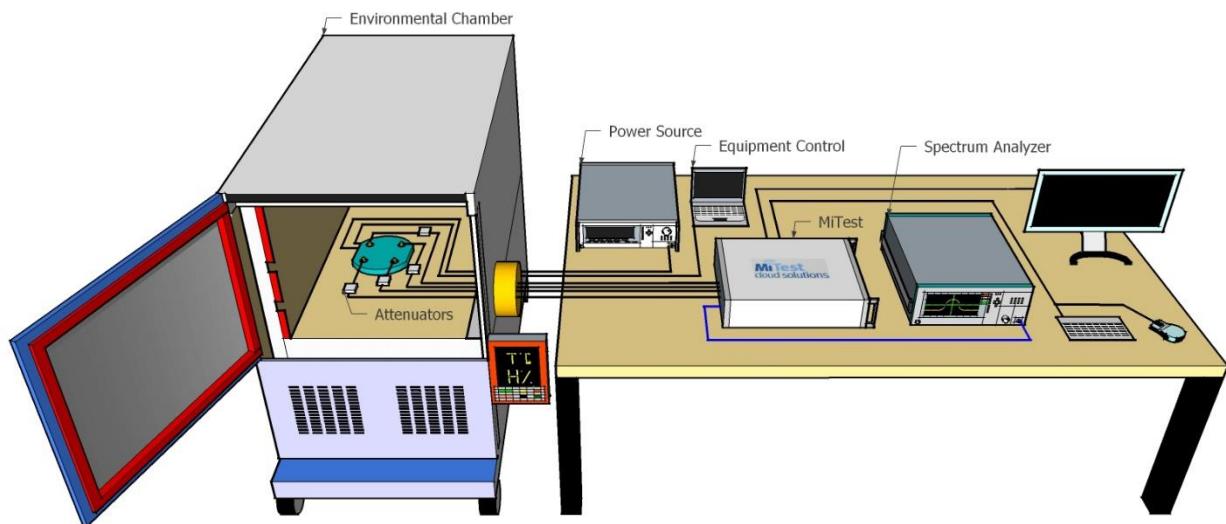
Test Header	Result	Data Link
6 dB & 99% Bandwidth	Complies	View Data
Conducted Output Power	Complies	View Data
Power Spectral Density	Complies	View Data
Emissions	Complies	View Data
(1) Conducted Emissions	Complies	View Data
(i) Conducted Spurious Emissions	Complies	View Data
(ii) Conducted Band-Edge Emissions	Complies	View Data
(2) Radiated Emissions	Complies	-
(i) TX Spurious & Restricted Band Emissions	Complies	View Data
(3) Digital Emissions (0.03 - 1 GHz)	Complies	View Data
(4) AC Wireline Emissions	Not Tested	View Data

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

7. TEST EQUIPMENT CONFIGURATION(S)

Conducted

MiTest Automated Test System



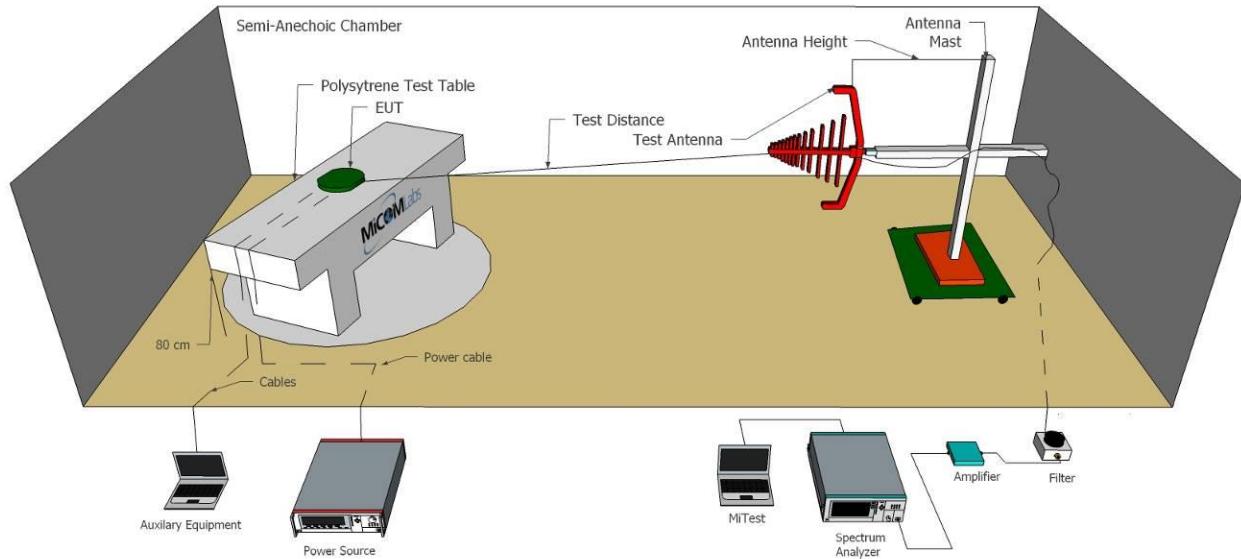
A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
#3 SA	MiTest Box to SA	Fairview Microwave	SCA1814-0101-72	#3 SA	8 May 2018
#3P1	EUT to MiTest box port 1	Fairview Microwave	SCA1814-0101-72	#3P1	8 May 2018
#3P2	EUT to MiTest box port 2	Fairview Microwave	SCA1814-0101-72	#3P2	8 May 2018
#3P3	EUT to MiTest box port 3	Fairview Microwave	SCA1814-0101-72	#3P3	8 May 2018
#3P4	EUT to MiTest box port 4	Fairview Microwave	SCA1812-0101-72	#3P4	8 May 2018
249	Resistance Thermometer	Thermotronics	GR2105-02	9340 #2	30 Oct 2018
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	2 May 2018
361	Desktop for RF#1, Labview Software installed	Dell	Vostro 220	WS RF#1	Not Required
390	USB Power Head 50MHz - 24GHz -60 to +20dBm	Agilent	U2002A	MY50000103	17 Dec 2018
398	MiTest RF Conducted Test Software	MiCOM	MiTest ATS	Version 4.1	Not Required
405	DC Power Supply 0-60V	Agilent	6654A	MY4001826	Cal when used
408	USB to GPIB interface	National Instruments	GPIB-USB HS	14C0DE9	Not Required
436	USB Wideband Power Sensor	Boonton	55006	8731	14 Sep 2018
441	USB Wideband Power Sensor	Boonton	55006	9179	20 Sep 2018
443	4x4 RF Switch Box	MiCOM Labs	MiTest 4X4 RF Switch Box	MIC003	8 May 2018
445	PoE Injector	D-Link	DPE-101GL	QTAH1E2000625	Not Required
461	Spectrum Analyzer	Agilent	E4440A	MY46185537	20 Sep 2018
510	Barometer/Thermometer	Control Company	68000-49	170871375	11 Dec 2018
75	Environmental Chamber	ThermaTron	SE-300-2-2	27946	24 Dec 2018

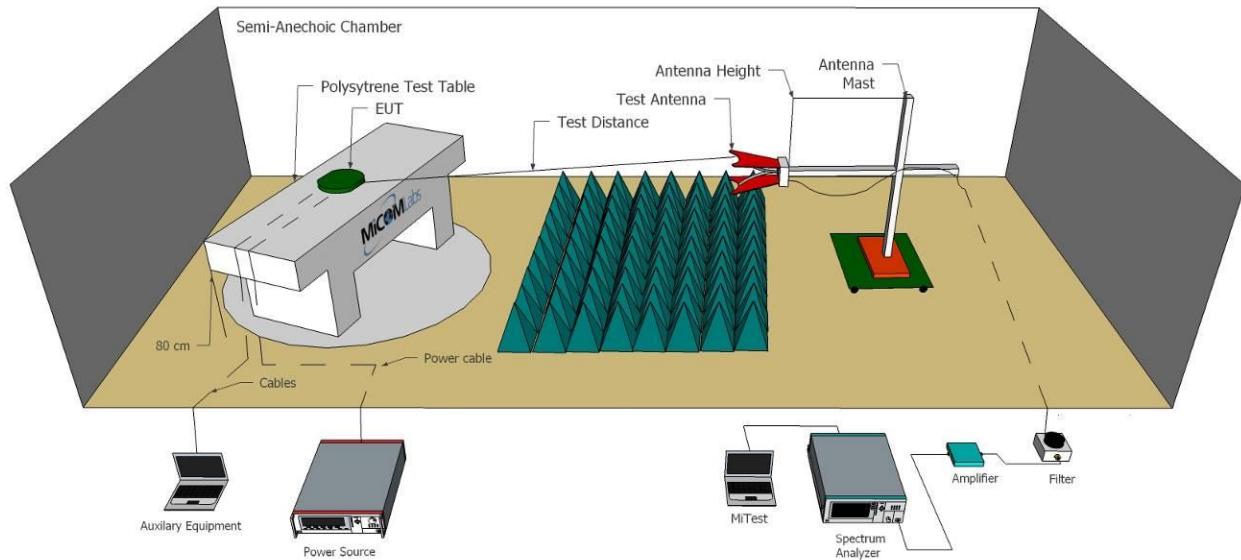
This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

Radiated Emissions - 3m Chamber

Radiated Emissions Below 1GHz Test Setup



Radiated Emissions Above 1GHz Test Setup



This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

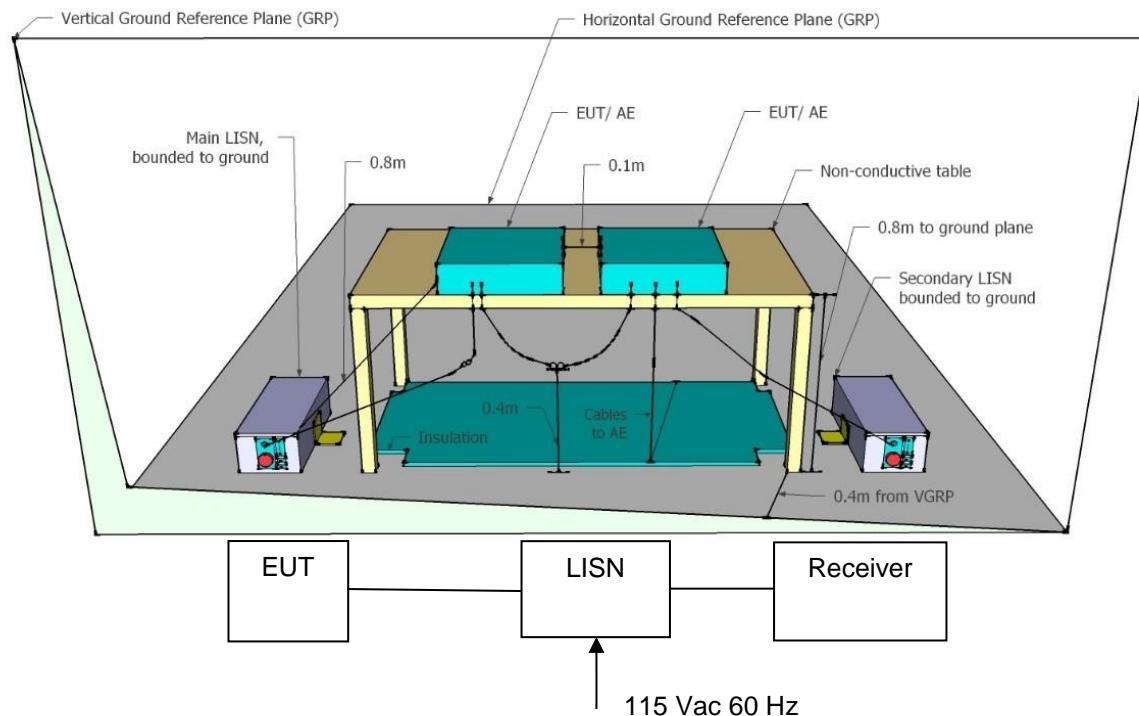
Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CU101	04R08507	Not Required
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	2 May 2018
298	3M Radiated Emissions Chamber Maintenance Check	MiCOM	3M Chamber	298	28 Apr 2018
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	5 Oct 2018
341	900MHz Notch Filter	EWT	EWT-14-0199	H1	6 Oct 2018
346	1.6 TO 10GHz High Pass Filter	EWT	EWT-57-0112	H1	6 Oct 2018
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	12 Oct 2018
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	12 Oct 2018
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	12 Oct 2018
410	Desktop Computer	Dell	Inspiron 620	WS38	Not Required
411	Mast/Turntable Controller	Sunol Sciences	SC98V	060199-1D	Not Required
412	USB to GPIB Interface	National Instruments	GPIB-USB HS	11B8DC2	Not Required
413	Mast Controller	Sunol Science	TWR95-4	030801-3	Not Required
415	Turntable Controller	Sunol Sciences	Turntable Controller	None	Not Required
447	MiTest Rad Emissions Test Software	MiCOM	Rad Emissions Test Software Version 1.0	447	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	4 Oct 2018
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	4 Oct 2018
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	4 Oct 2018
466	Low Pass Filter DC-1500 MHz	Mini-Circuits	NLP-1750+	VUU10401438	6 Oct 2018
480	Cable - Bulkhead to Amp	SRC Haverhill	157-3050360	480	6 Oct 2018
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-3050787	481	6 Oct 2018
482	Cable - Amp to Antenna	SRC Haverhill	157-3051574	482	6 Oct 2018
510	Barometer/Thermometer	Control Company	68000-49	170871375	11 Dec 2018
CC05	Confidence Check	MiCOM	CC05	None	19 Jul 2018

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

AC Wireline Emissions

The ac Wireline Conducted Emissions test was performed using the conducted test set-up shown in the diagram below.

Test Measurement Set up



This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 23 of 101

Assets Utilized for ac Wireline Emission Testing

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	30 Nov 2018
184	Pulse Limiter	Rhode & Schwarz	ESH3Z2	357.8810.52	6 Oct 2018
190	LISN (two-line V-network)	Rhode & Schwarz	ESH3Z5	836679/006	18 Oct 2018
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	2 May 2018
307	BNC-CABLE	Megaphase	1689 1GVT4	15F50B002	6 Oct 2018
316	Dell desktop computer workstation	Dell	Desktop	WS04	Not Required
372	AC Variable PS	California Instruments	1251P	L06951	Cal when used
388	LISN (3 Phase) 9kHz - 30MHz	Rhode & Schwarz	ESH2-Z5	892107/022	20 Oct 2018
496	MiTest Conducted Emissions test software.	MiCOM	Conducted Emissions Test Software Version 1.0	496	Not Required
CCEMC01	Confidence Check.	MiCOM	CCEMC01	None	2 Jul 2018

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

8. MEASUREMENT AND PRESENTATION OF TEST DATA

The measurement and graphical data presented in this test report was generated automatically using state-of-the-art technology creating an easy to read report structure. Numerical measurement data is separated from supporting graphical data (plots) through hyperlinks. Numerical measurement data can be reviewed without scrolling through numerous graphical pages to arrive at the next data matrix.

Plots have been relegated into the Appendix 'Graphical Data'.

Test and report automation was performed by [MiTest](#). [MiTest](#) is an automated test system developed by MiCOM Labs. [MiTest](#) is the first cloud based modular test system enabling end-to-end automation of regulatory compliance testing for conducted RF testing.



The MiCOM Labs "[MiTest](#)" Automated Test System" (Patent Pending)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

9. TEST RESULTS

9.1. 6 dB & 99% Bandwidth

Conducted Test Conditions for 6 dB and 99% Bandwidth			
Rules and Sections:	FCC CFR 47: 15.247 (a)(2) IC RSS-247:5.2	Ambient Temp. (°C):	24.0 - 27.5
Test Heading:	6 dB and 99 % Bandwidth	Rel. Humidity (%):	32 - 45
Standard Section(s):	ANSI C63.10:2013 KDB 558074 D01 Measurement Guidance V04	Pressure (mBars):	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for 6 dB and 99% Bandwidth Measurement

The bandwidth at 6 dB and 99 % was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

Testing was performed under ambient conditions at nominal voltage. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported.

Test configuration and setup used for the measurement was per the Conducted Test Set-up specified in this document.

KDB 558074 D01 DTS Measurement Guidance v04:

8.0 DTS bandwidth

One of the following procedures may be used to determine the modulated *DTS bandwidth*.

8.1 Option 1

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

8.2 Option 2

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW $\geq 3 \times$ RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 26 of 101

Equipment Configuration for 6 dB & 99% Bandwidth

Variant:	DSSS	Duty Cycle (%):	99
Data Rate:	2400.00 KBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
	Port(s)							
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
903.2	1.087				1.087	1.087	≥500.0	-0.59
914.0	1.092				1.092	1.092	≥500.0	-0.59
926.0	1.092				1.092	1.092	≥500.0	-0.59

Test Frequency	Measured 99% Bandwidth (MHz)				Maximum 99% Bandwidth (MHz)		
	Port(s)						
MHz	a	b	c	d			
903.2	1.202				1.202		
914.0	1.207				1.207		
926.0	1.217				1.217		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

9.2. Conducted Output Power

Conducted Test Conditions for Fundamental Emission Output Power						
Rules and Sections:	FCC CFR 47: 15.247 (b) & (c) IC RSS-247:5.4	Ambient Temp. (°C):	24.0 - 27.5			
Test Heading:	Output Power	Rel. Humidity (%):	32 - 45			
Standard Section(s):	ANSI C63.10; 11.9.1.3 KDB 558074 D01 Measurement Guidance V04	Pressure (mBars):	999 - 1001			
Reference Document(s):	See Normative References					
KDB 558074 D01 DTS Measurement Guidance v04:						
9.1.3 PKPM1 Peak-reading power meter method The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.						

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 28 of 101

Equipment Configuration for Peak Output Power

Variant:	DSSS	Duty Cycle (%):	99.0
Data Rate:	2400.00 KBit/s	Antenna Gain (dBi):	1.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Output Power (dBm)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
	Port(s)							
MHz	a	b	c	d	dBm	dBm	dB	
903.2	28.11				28.11	30.00	-1.89	17.00
914.0	28.84				28.84	30.00	-1.16	17.00
926.0	28.98				28.98	30.00	-1.02	17.00

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	± 1.33 dB

The above measurements are true pulse readings and therefore a Duty Cycling correction factor is not required.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

9.3. Power Spectral Density

Conducted Test Conditions for Power Spectral Density			
Rules and Sections:	FCC CFR 47: 15.247 (e) IC RSS-247:5.2	Ambient Temp. (°C):	24.0 - 27.5
Test Heading:	Power Spectral Density	Rel. Humidity (%):	32 - 45
Standard Section(s):	ANSI C63.10: 11.10.2 KDB 558074 D01 Measurement Guidance V04	Pressure (mBars):	999 - 1001
Reference Document(s):	See Normative References		

KDB 558074 D01 DTS Measurement Guidance v04:

10.2 Method PKPSD (peak PSD)

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.

a) Set analyzer center frequency to DTS channel center frequency.

b) Set the span to $1.5 \times$ DTS bandwidth.

c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.

d) Set the VBW $\geq 3 \times$ RBW.

e) Detector = peak.

f) Sweep time = auto couple.

g) Trace mode = max hold.

h) Allow trace to fully stabilize.

i) Use the peak marker function to determine the maximum amplitude level within the RBW.

j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 30 of 101

Equipment Configuration for Power Spectral Density - Peak

Variant:	DSSS	Duty Cycle (%):	99.0
Data Rate:	2400.00 KBit/s	Antenna Gain (dBi):	1.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Amplitude Summation	Limit	Margin
	Port(s) (dBm/3KHz)						
MHz	a	b	c	d	dBm/3KHz	dBm/3KHz	dB
903.2	3.872				3.872	8.0	-4.1
914.0	4.905				4.905	8.0	-3.1
926.0	5.653				5.653	8.0	-2.3

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

9.4. Emissions

9.4.1. Conducted Emissions

9.4.1.1. Conducted Spurious Emissions

Conducted Test Conditions for Transmitter Conducted Spurious and Band-Edge Emissions			
Rules and Sections:	FCC CFR 47:15.247 (d) IC RSS-247:5.5	Ambient Temp. (°C):	24.0 - 27.5
Test Heading:	Max Unwanted Emission Levels	Rel. Humidity (%):	32 - 45
Standard Section(s):	ANSI C63.10:2013: Sect 6.10.4, Sect 11.11; 11.12; 11.13 KDB 558074 D01 Measurement Guidance V04; Sect 11; Sect 12.	Pressure (mBars):	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Conducted Spurious and Band-Edge Emissions

Conducted Spurious Emissions and Band-edge were measured with a spectrum analyzer connected to the antenna terminal, while the EUT is operating in transmission mode at the appropriate frequency.

Test configuration and setup used for the measurement was per the Conducted Test Set-up specified in this document.

From ANSI C63.10 sect 11.11 Emissions in non-restricted frequency bands:

11.11.2: Reference Level easurement

The channel found to contain the maximum PSD level can be used to establish the reference level.

11.11.3 Emission level measurement

a) Set the center frequency and span to encompass frequency range to be measured.

b) Set the RBW = 100 kHz.

c) Set the VBW $\geq 3 \times$ RBW.

d) Detector = peak.

e) Sweep time = auto couple.

f) Trace mode = max hold.

g) Allow trace to fully stabilize.

h) Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b).

6.10.4 Authorized-band band-edge measurements (relative method)

These procedures are applicable for determining compliance at authorized-band band-edges where the requirements are expressed as a value relative to the in-band signal level. Procedures for determining compliance with field strength limits at or close to the band-edges are given in 6.10.6 (see also Table A.2).

For other than frequency-hopping devices, this test sequence shall be performed once. For devices that support frequency hopping, this test sequence shall be performed twice: once with the hopping function turned OFF and then repeated with the hopping function turned ON. The purpose of the test with the hopping function turned on is to confirm that the RF power remains OFF while the device is changing frequencies, and that the oscillator stabilizes at the new frequency before RF power is turned back ON. Overshoot of any oscillator, including phase-lock-loop stabilized oscillators, can cause the device to be temporarily tuned to frequencies outside the authorized band, and it is important that no transmissions occur during such temporary periods. Particular attention to the hopping sequence requirements specified below is needed in the case of adaptive frequency-hopping devices:

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

- a) Connect the EMI receiver or spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described in step e) (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).
- b) Set the EUT to the lowest frequency channel (for the hopping on test, the hopping sequence shall include the lowest frequency channel).
- c) Set the EUT to operate at maximum output power and 100% duty cycle, or equivalent “normal mode of operation” as specified in 6.10.3.
- d) If using the radiated method, then use the applicable procedure(s) of 6.4, 6.5, or 6.6, and orient the EUT and measurement antenna positions to produce the highest emission level.
- e) Perform the test as follows:
 - 1) Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.
 - 2) Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
 - 3) Attenuation: Auto (at least 10 dB preferred).
 - 4) Sweep time: Coupled.
 - 5) Resolution bandwidth: 100 kHz.
 - 6) Video bandwidth: 300 kHz.
 - 7) Detector: Peak.
 - 8) Trace: Max hold.
- f) Allow the trace to stabilize. For the test with the hopping function turned ON, this can take several minutes to achieve a reasonable probability of intercepting any emissions due to oscillator overshoot.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 33 of 101

Equipment Configuration for Conducted Spurious Emissions - Peak

Variant:	DSSS	Duty Cycle (%):	99
Data Rate:	2400.00 KBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Frequency Range	Conducted Spurious Emissions - Peak (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
903.2	30.0 - 10000.0	-42.010	-0.12						
914.0	30.0 - 10000.0	-42.579	0.14						
926.0	30.0 - 10000.0	-42.664	0.43						

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

Note: click the links in the above matrix to view the graphical image (plot).

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

9.4.1.2. Conducted Band-Edge Emissions

Equipment Configuration for Conducted Low Band-Edge Emissions - Peak

Variant:	DSSS	Duty Cycle (%):	99.0
Data Rate:	2400.00 KBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	903.2 MHz				
Band-Edge Frequency:	902.0 MHz				
Test Frequency Range:	850.0 - 915.0 MHz				
Port(s)	Band-Edge Markers and Limit			Revised Limit	Margin
	M1 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)
a	-13.85	0.81	902.50		-0.500

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS		
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB		

Note: click the links in the above matrix to view the graphical image (plot).



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 35 of 101

Equipment Configuration for Conducted High Band-Edge Emissions - Peak

Variant:	DSSS	Duty Cycle (%):	99.0
Data Rate:	2400.00 KBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Channel Frequency:	926.0 MHz				
Band-Edge Frequency:	928.0 MHz				
Test Frequency Range:	915.0 - 978.0 MHz				
Port(s)	Band-Edge Markers and Limit			Revised Limit	Margin
	M3 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)
a	-21.15	2.02	926.60		-1.400

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS		
Measurement Uncertainty:	<=40 GHz ±2.37 dB, > 40 GHz ±4.6 dB		

Note: click the links in the above matrix to view the graphical image (plot).

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

9.4.2. Radiated Emissions

9.4.2.3. TX Spurious & Restricted Band Emissions

Radiated Test Conditions for Radiated Spurious Emissions (Restricted Bands)			
Rules and Sections:	FCC CFR 47: Part 15.205 ISED RSS-GEN:8.9, 8.10	Ambient Temp. (°C):	20.0 - 24.5
Test Heading:	Radiated Spurious Emissions	Rel. Humidity (%):	32 - 45
Standard Section(s):	ANSI C63.10: 6.3, 6.5 & 6.6, 6.10 KDB 558074 D01 Measurement Guidance V04	Pressure (mBars):	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Radiated Spurious and Band-Edge Emissions (Restricted Bands)

Testing 30 – 10,000 MHz was performed in an anechoic chamber using a CISPR compliant receiver. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. To further maximize emissions the receive antenna was varied between 1 and 4 meters. The emissions are recorded with receiver in peak hold mode.

Emissions nearest the limits were chosen for maximization and formal measurement using a CISPR Compliant receiver. Emissions from 30 MHz – 1000 MHz are measured utilizing a CISPR compliant quasi-peak detector with a tuned receiver, using a bandwidth of 120 kHz. Emissions above 1000 MHz are measured utilizing a CISPR compliant average detector with a tuned receiver, using a bandwidth of 1 MHz. Only the highest emissions relative to the limit are listed.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

$$FS = R + AF + CORR - FO$$

where:

FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

NFL = Notch Filter Loss or Waveguide Loss

Example:

Given receiver input reading of 51.5 dBmV; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength (FS) of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 \text{ dBmV/m}$$

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are as follows:

$$\text{Level (dBmV/m)} = 20 * \log (\text{level (mV/m)})$$

$$40 \text{ dBmV/m} = 100 \text{ mV/m}$$

$$48 \text{ dBmV/m} = 250 \text{ mV/m}$$

Restricted Bands of Operation (15.205)

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

Frequency Band			
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

(b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

(c) Except as provided in paragraphs (d) and (e) of this section, regardless of the field strength limits specified elsewhere in this subpart, the provisions of this section apply to emissions from any intentional radiator.

(d) The following devices are exempt from the requirements of this section:

- (1) Swept frequency field disturbance sensors operating between 1.705 and 37 MHz provided their emissions only sweep through the bands listed in paragraph (a) of this section, the sweep is never stopped with the fundamental emission within the bands listed in paragraph (a) of this section, and the fundamental emission is outside of the bands listed in paragraph (a) of this section more than 99% of the time the device is actively transmitting, without compensation for duty cycle.
- (2) Transmitters used to detect buried electronic markers at 101.4 kHz which are employed by telephone companies.
- (3) Cable locating equipment operated pursuant to §15.213.
- (4) Any equipment operated under the provisions of §15.253, 15.255, and 15.256 in the frequency band 75-85 GHz, or §15.257 of this part.
- (5) Biomedical telemetry devices operating under the provisions of §15.242 of this part are not subject to the restricted band 608-614 MHz but are subject to compliance within the other restricted bands.
- (6) Transmitters operating under the provisions of subparts D or F of this part.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

(7) Devices operated pursuant to §15.225 are exempt from complying with this section for the 13.36-13.41 MHz band only.

(8) Devices operated in the 24.075-24.175 GHz band under §15.245 are exempt from complying with the requirements of this section for the 48.15-48.35 GHz and 72.225-72.525 GHz bands only, and shall not exceed the limits specified in §15.245(b).

(9) Devices operated in the 24.0-24.25 GHz band under §15.249 are exempt from complying with the requirements of this section for the 48.0-48.5 GHz and 72.0-72.75 GHz bands only, and shall not exceed the limits specified in §15.249(a).

(e) Harmonic emissions appearing in the restricted bands above 17.7 GHz from field disturbance sensors operating under the provisions of §15.245 shall not exceed the limits specified in §15.245(b).



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 39 of 101

Integral Antenna (Tai Sheng Chen 155-0010-00)

30-1000 MHz:

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	Tai Sheng Chen 155-0010-00	Variant:	OFDM
Antenna Gain (dBi):	1.20	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	903.20	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz

Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail
#1	860.73	43.62	6.13	-8.17	41.58	MaxQP	Horizontal	98	294	46.0	-4.4	Pass
#2	868.56	44.86	6.15	-8.10	42.91	MaxQP	Horizontal	98	277	46.0	-3.1	Pass
#3	871.25	44.04	6.17	-7.90	42.31	MaxQP	Horizontal	100	286	46.0	-3.7	Pass
#4	903.19	34.51	6.24	-8.01	32.74	Fundamental	Vertical	100	360	--	--	
#5	953.54	46.66	6.37	-7.26	45.77	NRB	Horizontal	230	338	46.0	--	Pass
#6	957.92	47.28	6.38	-7.08	46.58	NRB	Horizontal	226	337	46.0	--	Pass
#7	966.88	47.64	6.42	-7.09	46.97	MaxQP	Horizontal	223	328	53.0	-6.0	Pass
#8	976.20	47.61	6.45	-7.02	47.04	MaxQP	Horizontal	233	326	53.0	-6.0	Pass

Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 40 of 101

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	Tai Sheng Chen 155-0010-00	Variant:	OFDM
Antenna Gain (dBi):	1.20	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	914.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	860.76	48.25	6.13	-8.17	46.21	Peak (NRB)	Horizontal	100	0	--	--	Pass	
#2	867.82	48.19	6.14	-8.11	46.22	Peak (NRB)	Horizontal	100	0	--	--	Pass	
#3	871.23	47.03	6.17	-7.90	45.30	Peak (NRB)	Horizontal	100	0	--	--	Pass	
#4	914.18	34.30	6.25	-7.82	32.73	Fundamental	Vertical	100	190	--	--		
#5	954.23	50.46	6.37	-7.27	49.56	Peak (NRB)	Horizontal	100	0	--	--	Pass	
#6	956.93	50.08	6.38	-7.17	49.29	Peak (NRB)	Horizontal	100	0	--	--	Pass	
#7	958.22	50.95	6.39	-7.28	50.06	Peak (NRB)	Horizontal	100	0	--	--	Pass	
#8	960.95	46.31	6.40	-7.37	45.34	MaxQP	Horizontal	234	327	53.0	-7.7	Pass	
#9	987.12	45.54	6.46	-6.76	45.24	MaxQP	Horizontal	214	319	53.0	-7.8	Pass	

Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 41 of 101

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	Tai Sheng Chen 155-0010-00	Variant:	OFDM
Antenna Gain (dBi):	1.20	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	926.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	860.32	49.62	6.13	-8.17	47.58	Peak (NRB)	Horizontal	100	0	--	--	Pass	
#2	862.81	50.05	6.14	-8.15	48.04	Peak (NRB)	Horizontal	100	0	--	--	Pass	
#3	869.65	49.80	6.16	-8.10	47.86	Peak (NRB)	Horizontal	100	0	--	--	Pass	
#4	926.13	68.16	6.28	-7.67	66.77	Fundamental	Horizontal	100	0	--	--		
#5	952.37	49.51	6.37	-7.26	48.62	Peak (NRB)	Horizontal	100	0	--	--	Pass	
#6	958.15	50.64	6.39	-7.28	49.75	Peak (NRB)	Horizontal	100	0	--	--	Pass	
#7	960.85	46.58	6.40	-7.37	45.61	MaxQP	Horizontal	223	332	53.0	-7.4	Pass	
#8	963.00	46.88	6.39	-7.14	46.13	MaxQP	Horizontal	147	337	53.0	-6.9	Pass	

Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 42 of 101

1-10 GHz

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	Tai Sheng Chen 155-0010-00	Variant:	OFDM
Antenna Gain (dBi):	1.20	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	903.20	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	2709.60	58.72	2.35	-11.99	49.08	Max Peak	Horizontal	127	307	74.0	-24.9	Pass	
#2	2709.60	43.91	2.35	-11.99	34.27	Max Avg	Horizontal	127	307	54.0	-19.7	Pass	
#3	6322.02	54.10	3.24	-9.22	48.12	Peak (NRB)	Vertical	100	0	--	--	Pass	

Test Notes: EUT powered by 4 volt DC,

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 43 of 101

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	Tai Sheng Chen 155-0010-00	Variant:	OFDM
Antenna Gain (dBi):	1.20	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	914.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	2741.88	58.93	2.39	-11.97	49.35	Max Peak	Horizontal	170	310	74.0	-24.7	Pass	
#2	2741.88	44.37	2.39	-11.97	34.79	Max Avg	Horizontal	170	310	54.0	-19.2	Pass	
#3	6398.68	55.50	3.21	-9.22	49.49	Peak (NRB)	Vertical	100	0	--	--	Pass	

Test Notes: EUT powered by 4 volt DC,

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 44 of 101

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	Tai Sheng Chen 155-0010-00	Variant:	OFDM
Antenna Gain (dBi):	1.20	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	926.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	2777.92	60.16	2.40	-12.02	50.54	Max Peak	Horizontal	121	305	74.0	-23.5	Pass	
#2	2777.92	45.83	2.40	-12.02	36.21	Max Avg	Horizontal	121	305	54.0	-17.8	Pass	
#3	6482.08	56.28	3.14	-8.93	50.49	Peak (NRB)	Vertical	100	181	--	--	Pass	

Test Notes: EUT powered by 4 volt DC,

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 45 of 101

OMNI Antenna (WPANT30017-CA)

30-1000 MHz

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	WP WPANT30017-CA	Variant:	OFDM
Antenna Gain (dBi):	3.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	903.20	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	764.86	41.40	5.89	-9.57	37.72	MaxQP	Vertical	197	108	46.0	-8.3	Pass	
#2	789.05	42.38	5.94	-9.05	39.27	MaxQP	Vertical	171	261	46.0	-6.7	Pass	
#3	844.49	42.41	6.08	-8.33	40.16	MaxQP	Vertical	153	42	46.0	-5.8	Pass	
#4	856.23	43.30	6.11	-8.21	41.20	MaxQP	Vertical	136	304	46.0	-4.8	Pass	
#5	859.13	43.58	6.13	-8.18	41.53	MaxQP	Vertical	145	354	46.0	-4.5	Pass	
#6	867.45	43.42	6.14	-8.11	41.45	MaxQP	Vertical	141	0	46.0	-4.6	Pass	
#7	903.21	37.43	6.24	-8.01	35.66	Fundamental	Vertical	100	0	--	--		
#8	953.94	45.85	6.37	-7.26	44.96	MaxQP	Vertical	149	226	46.0	-1.0	Pass	
#9	957.35	47.15	6.38	-7.08	46.45	Peak (NRB)	Vertical	100	0	--	--	Pass	
#10	958.95	47.34	6.39	-7.28	46.45	Peak (NRB)	Vertical	100	0	--	--	Pass	
#11	963.33	46.80	6.40	-7.23	45.97	MaxQP	Vertical	101	178	53.0	-7.0	Pass	
#12	969.81	46.00	6.45	-7.06	45.39	MaxQP	Vertical	100	165	53.0	-7.6	Pass	

Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overload.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 46 of 101

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	WP WPANT30017-CA	Variant:	OFDM
Antenna Gain (dBi):	3.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	914.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	846.57	43.66	6.08	-8.27	41.47	MaxQP	Vertical	189	202	46.0	-4.5	Pass	
#2	856.16	43.78	6.11	-8.21	41.68	MaxQP	Vertical	152	189	46.0	-4.3	Pass	
#3	860.46	44.52	6.13	-8.17	42.48	MaxQP	Vertical	128	200	46.0	-3.5	Pass	
#4	863.76	44.83	6.13	-8.14	42.82	MaxQP	Vertical	138	189	46.0	-3.2	Pass	
#5	869.82	43.52	6.16	-8.10	41.58	MaxQP	Vertical	101	183	46.0	-4.4	Pass	
#6	913.93	35.47	6.25	-7.82	33.90	Fundamental	Horizontal	100	197	--	--		
#7	954.89	45.51	6.37	-7.27	44.61	MaxQP	Vertical	123	0	46.0	-1.4	Pass	
#8	956.55	46.64	6.38	-7.17	45.85	Peak (NRB)	Vertical	100	0	--	--	Pass	
#9	959.19	45.92	6.39	-7.18	45.13	Peak (NRB)	Vertical	100	0	--	--	Pass	
#10	962.06	47.57	6.39	-7.14	46.82	MaxQP	Vertical	108	211	53.0	-6.2	Pass	
#11	972.42	47.02	6.43	-7.10	46.35	MaxQP	Vertical	101	212	53.0	-6.7	Pass	
#12	975.79	47.47	6.44	-6.94	46.97	MaxQP	Vertical	189	254	53.0	-6.0	Pass	

Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 47 of 101

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	WP WPANT30017-CA	Variant:	OFDM
Antenna Gain (dBi):	3.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	926.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	837.99	41.59	6.05	-8.56	39.08	MaxQP	Vertical	144	174	46.0	-6.9	Pass	
#2	855.07	42.56	6.11	-8.23	40.44	MaxQP	Vertical	152	175	46.0	-5.6	Pass	
#3	862.46	44.31	6.14	-8.15	42.30	MaxQP	Vertical	150	188	46.0	-3.7	Pass	
#4	865.87	43.74	6.13	-8.03	41.84	MaxQP	Vertical	98	179	46.0	-4.2	Pass	
#5	926.48	62.68	6.28	-7.67	61.29	Fundamental	Vertical	100	0	--	--		
#6	956.53	44.94	6.38	-7.17	44.15	MaxQP	Vertical	112	20	46.0	-1.9	Pass	
#7	959.07	44.48	6.39	-7.18	43.69	MaxQP	Vertical	109	4	46.0	-2.3	Pass	
#8	962.27	46.80	6.39	-7.14	46.05	MaxQP	Vertical	185	235	53.0	-7.0	Pass	
#9	973.73	46.31	6.43	-6.98	45.76	MaxQP	Vertical	205	254	53.0	-7.2	Pass	

Test Notes: EUT powered by 4V DC.. 900 MHz notch in front of amp to prevent overload.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 48 of 101

1-10 GHz

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	WP WPANT30017-CA	Variant:	OFDM
Antenna Gain (dBi):	3.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	903.20	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

1000.00 - 10000.00 MHz

Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail
#1	1806.36	59.58	2.03	-14.43	47.18	Peak (NRB)	Vertical	151	200	--	--	Pass
#2	6322.96	58.91	3.24	-9.22	52.93	Peak (NRB)	Vertical	151	156	--	--	Pass

Test Notes: EUT powered by 4 volt DC,

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 49 of 101

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	WP WPANT30017-CA	Variant:	OFDM
Antenna Gain (dBi):	3.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	914.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	1828.07	58.38	2.02	-14.05	46.35	Peak (NRB)	Vertical	151	14	--	--	Pass	
#2	6397.47	59.76	3.21	-9.23	53.74	Peak (NRB)	Horizontal	200	257	--	--	Pass	

Test Notes: EUT powered by 4 volt DC,

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 50 of 101

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	WP WPANT30017-CA	Variant:	OFDM
Antenna Gain (dBi):	3.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	926.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	5555.67	53.82	3.15	-11.33	45.64	Peak (NRB)	Vertical	100	0	--	--	Pass	
#2	6482.18	57.49	3.14	-8.93	51.70	Peak (NRB)	Vertical	100	0	--	--	Pass	

Test Notes: EUT powered by 4 volt DC,

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 51 of 101

Wrap Antenna (WPANT40020-SA)

30-1000 MHz

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	WP WPANT40020-SA	Variant:	OFDM
Antenna Gain (dBi):	1.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	903.20	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz

Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail
#1	870.01	42.39	6.17	-8.10	40.46	MaxQP	Horizontal	189	203	46.0	-5.5	Pass
#2	902.88	32.48	6.24	-8.01	30.71	Fundamental	Horizontal	150	0	--	--	
#3	952.04	46.84	6.37	-7.26	45.95	MaxQP	Horizontal	150	182	46.0	-0.1	Pass
#4	955.27	47.25	6.37	-7.17	46.45	Peak (NRB)	Horizontal	100	0	--	--	Pass
#5	959.67	48.41	6.39	-7.18	47.62	Peak (NRB)	Horizontal	100	0	--	--	Pass
#6	960.64	48.12	6.40	-7.37	47.15	MaxQP	Horizontal	161	168	53.0	-5.9	Pass
#7	967.46	47.96	6.44	-7.27	47.13	MaxQP	Horizontal	161	166	53.0	-5.9	Pass
#8	969.38	48.23	6.45	-7.06	47.62	MaxQP	Horizontal	159	172	53.0	-5.4	Pass
#9	975.29	46.02	6.44	-6.94	45.52	MaxQP	Horizontal	169	181	53.0	-7.5	Pass

Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overload.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 52 of 101

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	WP WPANT40020-SA	Variant:	OFDM
Antenna Gain (dBi):	1.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	914.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	862.06	41.97	6.14	-8.15	39.96	MaxQP	Horizontal	184	202	46.0	-6.0	Pass	
#2	868.45	39.58	6.15	-8.10	37.63	MaxQP	Horizontal	120	210	46.0	-8.4	Pass	
#3	913.99	39.61	6.25	-7.82	38.04	Fundamental	Horizontal	100	214	--	--		
#4	956.90	44.69	6.38	-7.17	43.90	MaxQP	Horizontal	157	173	46.0	-2.1	Pass	
#5	959.77	44.62	6.39	-7.18	43.83	MaxQP	Horizontal	162	179	46.0	-2.2	Pass	
#6	962.63	44.46	6.39	-7.14	43.71	MaxQP	Horizontal	159	179	53.0	-9.3	Pass	
#7	966.05	45.27	6.42	-7.09	44.60	MaxQP	Horizontal	105	175	53.0	-8.4	Pass	

Test Notes: Powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 53 of 101

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	WP WPANT40020-SA	Variant:	OFDM
Antenna Gain (dBi):	1.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	926.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	861.98	42.77	6.14	-8.16	40.75	MaxQP	Horizontal	118	171	46.0	-5.3	Pass	
#2	873.98	42.95	6.17	-8.10	41.02	MaxQP	Horizontal	118	201	46.0	-5.0	Pass	
#3	926.08	57.58	6.28	-7.67	56.19	Fundamental	Horizontal	100	0	--	--		
#4	956.98	45.77	6.38	-7.17	44.98	MaxQP	Horizontal	157	184	46.0	-1.0	Pass	
#5	958.05	45.47	6.39	-7.28	44.58	MaxQP	Horizontal	231	191	46.0	-1.4	Pass	
#6	959.92	45.82	6.39	-7.18	45.03	MaxQP	Horizontal	162	185	46.0	-1.0	Pass	
#7	960.50	45.52	6.40	-7.37	44.55	MaxQP	Horizontal	170	185	53.0	-8.5	Pass	
#8	963.40	45.37	6.40	-7.23	44.54	MaxQP	Horizontal	154	195	53.0	-8.5	Pass	
#9	977.99	48.81	6.46	-7.00	48.27	MaxQP	Horizontal	104	186	53.0	-4.7	Pass	

Test Notes: Powered by 4V DC. 900 MHz notch in front of amp.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 54 of 101

1-10 GHz

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	WP WPANT40020-SA	Variant:	OFDM
Antenna Gain (dBi):	1.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	903.20	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

1000.00 - 10000.00 MHz														
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail		
#1	1806.54	67.50	2.03	-14.43	55.10	Peak (NRB)	Horizontal	150	173	--	--	Pass		
#2	2709.78	56.95	2.35	-11.99	47.31	Max Peak	Vertical	185	120	74.0	-26.7	Pass		
#3	2709.78	47.38	2.35	-11.99	37.74	Max Avg	Vertical	185	120	54.0	-16.3	Pass		
#4	4515.90	54.89	2.90	-11.93	45.86	Max Peak	Horizontal	150	70	74.0	-28.1	Pass		
#5	4515.90	43.03	2.90	-11.93	34.00	Max Avg	Horizontal	150	70	54.0	-20.0	Pass		
#6	5419.45	55.71	3.12	-11.74	47.09	Max Peak	Vertical	166	167	74.0	-26.9	Pass		
#7	5419.45	43.54	3.12	-11.74	34.92	Max Avg	Vertical	166	167	54.0	-19.1	Pass		
#8	6322.46	68.47	3.24	-9.22	62.49	Peak (NRB)	Vertical	150	173	--	--	Pass		

Test Notes: EUT powered by 4 volt DC,

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 55 of 101

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	WP WPANT40020-SA	Variant:	OFDM
Antenna Gain (dBi):	1.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	914.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	1827.96	67.69	2.02	-14.07	55.64	Peak (NRB)	Horizontal	100	167	--	--	Pass	
#2	6397.50	56.32	3.21	-9.23	50.30	Peak (NRB)	Vertical	100	167	--	--	Pass	

Test Notes: EUT powered by 4 volt DC,

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 56 of 101

Equipment Configuration for TX Spurious & Restricted Band Emissions

Antenna:	WP WPANT40020-SA	Variant:	OFDM
Antenna Gain (dBi):	1.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	926.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	1852.03	68.39	2.02	-13.81	56.60	Peak (NRB)	Horizontal	100	196	--	--	Pass	
#2	2777.94	60.31	2.40	-12.02	50.69	Max Peak	Horizontal	101	137	74.0	-23.3	Pass	
#3	2777.94	44.48	2.40	-12.02	34.86	Max Avg	Horizontal	101	137	54.0	-19.1	Pass	
#4	6480.71	57.61	3.14	-8.92	51.83	Peak (NRB)	Vertical	100	0	--	--	Pass	
#5	8334.11	58.48	3.98	-8.16	54.30	Max Peak	Vertical	181	187	74.0	-19.7	Pass	
#6	8334.11	39.82	3.98	-8.16	35.64	Max Avg	Vertical	181	187	54.0	-18.4	Pass	

Test Notes: EUT powered by 4 volt DC,

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

9.4.3. Digital Emissions (0.03 - 1 GHz)

Radiated Test Conditions for Radiated Digital Emissions (0.03 – 1 GHz)			
Rules and Sections:	FCC CFR 47:15.209, ICES-003: 6.2 RSS-GEN: 7	Ambient Temp. (°C):	20.0 - 24.5
Test Heading:	Digital Emissions, Receiver Emissions	Rel. Humidity (%):	32 - 45
Standard Section(s):	ANSI C63.4: 8.3	Pressure (mBars):	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Radiated Digital Emissions and Receiver Emissions (0.03 – 10 GHz)

Testing 30 – 6,000 MHz was performed in an anechoic chamber using a CISPR compliant receiver. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. To further maximize emissions the receive antenna was varied between 1 and 4 meters. The emissions are recorded with receiver in peak hold mode.

Emissions nearest the limits were chosen for maximization and formal measurement using a CISPR Compliant receiver. Emissions from 30 MHz – 1000 MHz are measured utilizing a CISPR compliant quasi-peak detector with a tuned receiver, using a bandwidth of 120 kHz. Emissions above 1000 MHz are measured utilizing a CISPR compliant average detector with a tuned receiver, using a bandwidth of 1 MHz. Only the highest emissions relative to the limit are listed.

Test configuration and setup for Radiated Digital and Receiver Emissions Measurement were per the Radiated Test Set-up specified in this document.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver.

$$FS = R + AF + CORR$$

where:

FS = Field Strength

R = Measured Receiver Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss

AG = Amplifier Gain

For example:

Given a Receiver input reading of 51.5dBmV; Antenna Factor of 8.5dB; Cable Loss of 1.3dB; Falloff Factor of 0dB, an Amplifier Gain of 26dB and Notch Filter Loss of 1dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3\text{dBmV/m}$$

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are done as:

$$\text{Level (dBmV/m)} = 20 * \text{Log (level (mV/m))}$$

$$40 \text{ dBmV/m} = 100\text{mV/m}$$

$$48 \text{ dBmV/m} = 250\text{mV/m}$$

Limits for Radiated Digital Emissions (0.03 – 1 GHz)

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength		Measurement Distance (m)
	µV/m (microvolts/meter)	dBµV/m (dB microvolts/meter)	
0.009-0.490	2400/F(kHz)	--	300
0.490-1.705	24000/F(kHz)	--	30
1.705-30.0	30	29.5	30
30-88	100**	40	3
88-216	150**	43.5	3
216-960	200**	46.0	3
Above 960	500	54.0	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241. (b) In the emission table above, the tighter limit applies at the band edges. (c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other sections within this part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. (d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. (e) The provisions in §§15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part. (f) In accordance with §15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in §15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in §15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator and which fall within the restricted bands shall comply with the general radiated emission limits in §15.109 that are applicable to the incorporated digital device. (g) Perimeter protection systems may operate in the 54-72 MHz and 76-88 MHz bands under the provisions of this section. The use of such perimeter protection systems is limited to industrial, business and commercial applications.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 59 of 101

USB Active and Downloading, Connected to SBC Computer

Equipment Configuration for Radiated Digital Emissions

Antenna:	WP WPANT30017-CA	Variant:	OFDM
Antenna Gain (dBi):	3.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	
Channel Frequency (MHz):	0.00	Data Rate:	
Power Setting:	NA	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	39.02	43.91	3.47	-17.37	30.01	MaxQP	Vertical	104	71	40.0	-10.0	Pass	
#2	431.96	49.59	4.99	-14.31	40.27	MaxQP	Horizontal	204	154	46.0	-5.7	Pass	
#3	443.99	49.98	5.02	-14.21	40.79	MaxQP	Horizontal	101	356	46.0	-5.2	Pass	
#4	456.01	50.18	5.04	-13.93	41.29	MaxQP	Horizontal	282	349	46.0	-4.7	Pass	
#5	468.02	47.67	5.07	-13.37	39.37	MaxQP	Horizontal	101	301	46.0	-6.6	Pass	
#6	503.99	48.65	5.20	-13.23	40.62	MaxQP	Horizontal	159	160	46.0	-5.4	Pass	

Test Notes: Powered by AC/DC PS. Digital Communications over USB. Connected to SBC.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 60 of 101

USB Not Active

Equipment Configuration for Radiated Digital Emissions

Antenna:	Tai Sheng Chen 155-0010-00	Variant:	FHSS
Antenna Gain (dBi):	1.20	Modulation:	FSK
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	915.2	Data Rate:	Not Applicable
Power Setting:	NA	Tested By:	JMH

Test Measurement Results

[Click here to view measurement data...](#)

Test Notes: EUT powered by 4V DC. Receiver Emissions

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 61 of 101

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	WP WPANT40020-SA	Variant:	OFDM
Antenna Gain (dBi):	1.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	903.20	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz

Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail
#1	870.01	42.39	6.17	-8.10	40.46	MaxQP	Horizontal	189	203	46.0	-5.5	Pass
#2	902.88	32.48	6.24	-8.01	30.71	Fundamental	Horizontal	150	0	--	--	
#3	952.04	46.84	6.37	-7.26	45.95	MaxQP	Horizontal	150	182	46.0	-0.1	Pass
#4	955.27	47.25	6.37	-7.17	46.45	NRB	Horizontal	153	188	46.0	--	Pass
#5	959.67	48.41	6.39	-7.18	47.62	NRB	Horizontal	162	178	46.0	--	Pass
#6	960.64	48.12	6.40	-7.37	47.15	MaxQP	Horizontal	161	168	53.0	-5.9	Pass
#7	967.46	47.96	6.44	-7.27	47.13	MaxQP	Horizontal	161	166	53.0	-5.9	Pass
#8	969.38	48.23	6.45	-7.06	47.62	MaxQP	Horizontal	159	172	53.0	-5.4	Pass
#9	975.29	46.02	6.44	-6.94	45.52	MaxQP	Horizontal	169	181	53.0	-7.5	Pass

Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overload.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 62 of 101

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	WP WPANT40020-SA	Variant:	OFDM
Antenna Gain (dBi):	1.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	914.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	862.06	41.97	6.14	-8.15	39.96	MaxQP	Horizontal	184	202	46.0	-6.0	Pass	
#2	868.45	39.58	6.15	-8.10	37.63	MaxQP	Horizontal	120	210	46.0	-8.4	Pass	
#3	913.99	39.61	6.25	-7.82	38.04	Fundamental	Horizontal	100	214	--	--		
#4	956.90	44.69	6.38	-7.17	43.90	MaxQP	Horizontal	157	173	46.0	-2.1	Pass	
#5	959.77	44.62	6.39	-7.18	43.83	MaxQP	Horizontal	162	179	46.0	-2.2	Pass	
#6	962.63	44.46	6.39	-7.14	43.71	MaxQP	Horizontal	159	179	53.0	-9.3	Pass	
#7	966.05	45.27	6.42	-7.09	44.60	MaxQP	Horizontal	105	175	53.0	-8.4	Pass	

Test Notes: Powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 63 of 101

Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

Antenna:	WP WPANT40020-SA	Variant:	OFDM
Antenna Gain (dBi):	1.00	Modulation:	OFDM
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	99
Channel Frequency (MHz):	926.00	Data Rate:	2400.00 KBit/s
Power Setting:	17	Tested By:	JMH

Test Measurement Results

30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
#1	861.98	42.77	6.14	-8.16	40.75	MaxQP	Horizontal	118	171	46.0	-5.3	Pass	
#2	873.98	42.95	6.17	-8.10	41.02	MaxQP	Horizontal	118	201	46.0	-5.0	Pass	
#3	926.08	57.58	6.28	-7.67	56.19	Fundamental	Horizontal	100	0	--	--		
#4	956.98	45.77	6.38	-7.17	44.98	MaxQP	Horizontal	157	184	46.0	-1.0	Pass	
#5	958.05	45.47	6.39	-7.28	44.58	MaxQP	Horizontal	231	191	46.0	-1.4	Pass	
#6	959.92	45.82	6.39	-7.18	45.03	MaxQP	Horizontal	162	185	46.0	-1.0	Pass	
#7	960.50	45.52	6.40	-7.37	44.55	MaxQP	Horizontal	170	185	53.0	-8.5	Pass	
#8	963.40	45.37	6.40	-7.23	44.54	MaxQP	Horizontal	154	195	53.0	-8.5	Pass	
#9	977.99	48.81	6.46	-7.00	48.27	MaxQP	Horizontal	104	186	53.0	-4.7	Pass	

Test Notes: Powered by 4V DC. 900 MHz notch in front of amp.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

9.4.4. AC Wireline Emissions

Test Conditions for ac Wireline Emissions (0.15 – 30 MHz)			
Rules and Sections:	FCC CFR 47:15.207 ICES-003:6.1	Ambient Temp. (°C):	20.0 - 24.5
Test Heading:	Conducted (ac Wireline Emissions)	Rel. Humidity (%):	32 - 45
Standard Section(s):	ANSI C63.4: 7.3	Pressure (mBars):	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for ac Wireline Emissions (0.15 – 30 MHz)

The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

Test configuration and setup for ac Wireline Emission Measurement were per the ac Wireline Test Set-up specified in this document.

Limits for ac Wireline Emissions

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBmV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

- (1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.
- (2) For all other carrier current systems: 1000 μ V within the frequency band 535-1705 kHz, as measured using a 50 μ H/50 ohms LISN.
- (3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

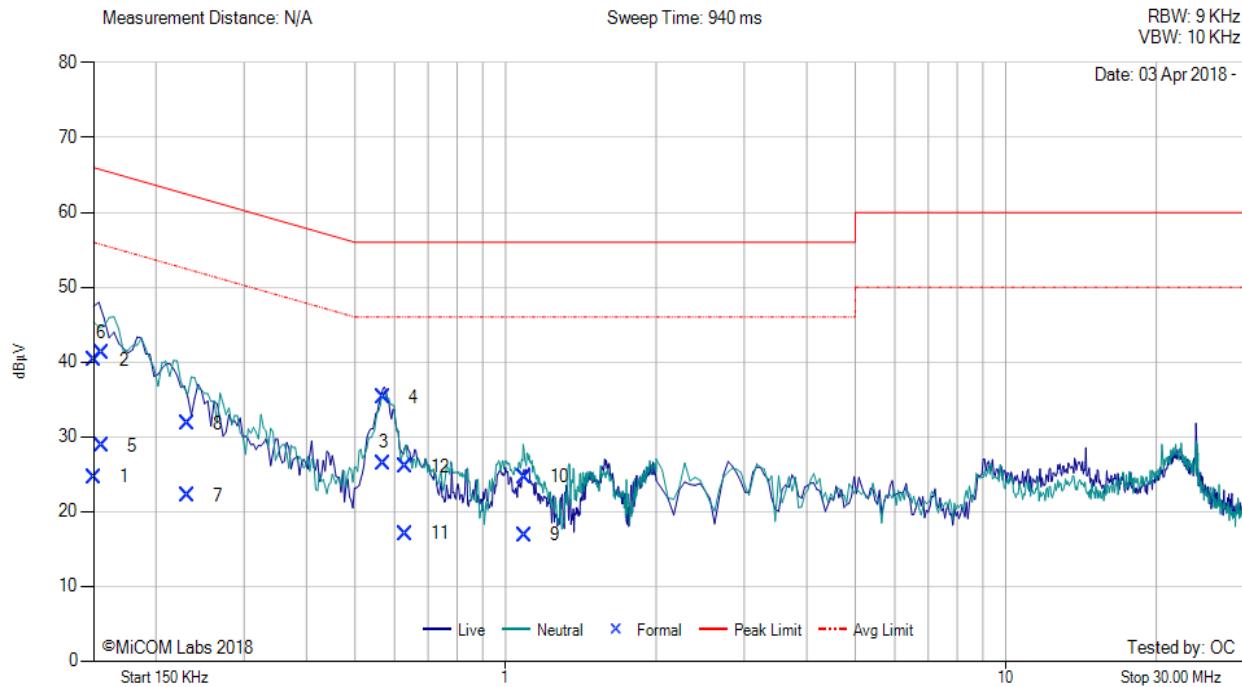
This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

Measurement Results

Model:	NIC-510-06	Configuration tested:	AC/DC POWERED
Input power:	120V _{AC} /60Hz	Standard:	FCC 15B



Variant: AC Wireline, Test Freq: 0.15 - 30 MHz



Num	Frequency MHz	Raw dB μ V	Cable Loss dB	Factor dB	Total Correction dB μ V	Corrected Value dB μ V	Measurement Type	Line	Limit dB μ V/m	Margin dB	Pass /Fail
1	0.150	14.64	0.05	9.92	9.97	24.61	Max Avg	Live	56.0	-31.4	Pass
2	0.150	30.27	0.05	9.92	9.97	40.24	Max Qp	Live	66.0	-25.8	Pass
3	0.570	16.43	0.10	9.92	10.02	26.45	Max Avg	Live	46.0	-19.6	Pass
4	0.570	25.29	0.10	9.92	10.02	35.31	Max Qp	Live	56.0	-20.7	Pass
5	0.156	18.81	0.05	9.92	9.97	28.78	Max Avg	Neutral	55.8	-27.1	Pass
6	0.156	31.21	0.05	9.92	9.97	41.18	Max Qp	Neutral	65.8	-24.7	Pass
7	0.231	12.13	0.07	9.92	9.99	22.12	Max Avg	Live	53.7	-31.6	Pass
8	0.231	21.76	0.07	9.92	9.99	31.75	Max Qp	Live	63.7	-31.9	Pass
9	1.091	6.83	0.08	9.94	10.02	16.85	Max Avg	Neutral	46.0	-29.2	Pass
10	1.091	14.61	0.08	9.94	10.02	24.63	Max Qp	Neutral	56.0	-31.4	Pass
11	0.631	6.98	0.11	9.93	10.04	17.02	Max Avg	Neutral	46.0	-29.0	Pass
12	0.631	15.94	0.11	9.93	10.04	25.98	Max Qp	Neutral	56.0	-30.0	Pass

Test Notes: Model: NIC 510-06. AC/DC powered at 120V_{ac}, 60Hz.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

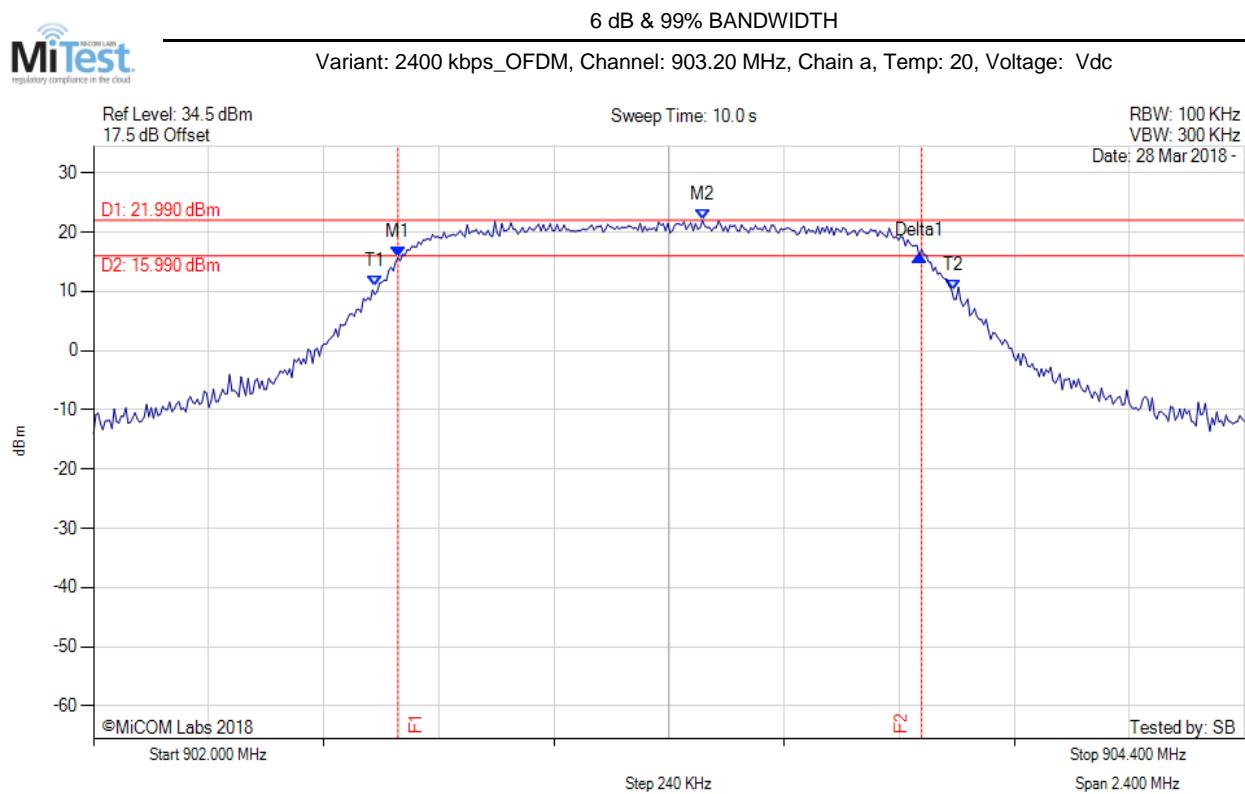


Title: Itron, Inc. NIC 510-06
To: FCC CFR 47 Part 15.247 (DTS); IC RSS-247
Serial #: ITRO01-U3 Rev A
Issue Date: 9th May 2018
Page: 66 of 101

A. APPENDIX - GRAPHICAL IMAGES

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

A.1. 6 dB & 99% Bandwidth



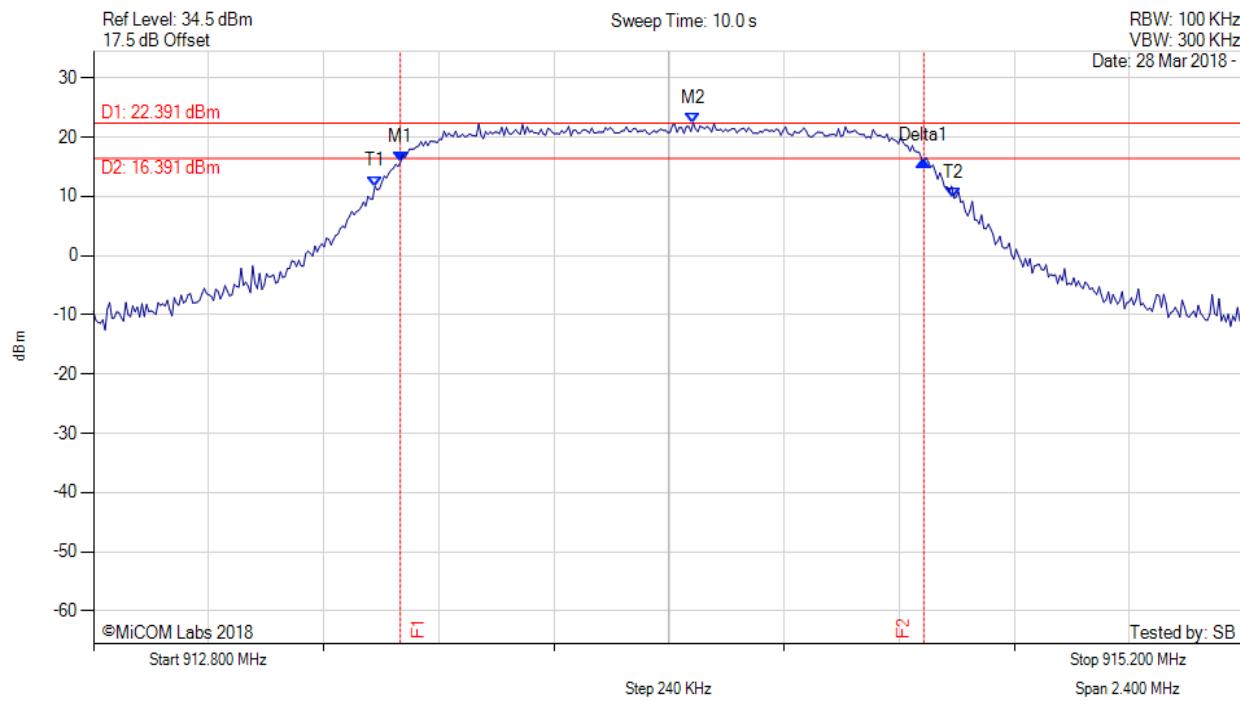
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 30 Trace Mode = MAX HOLD	M1 : 902.635 MHz : 15.682 dBm M2 : 903.270 MHz : 21.987 dBm Delta1 : 1.087 MHz : 0.344 dB T1 : 902.587 MHz : 10.856 dBm T2 : 903.794 MHz : 10.099 dBm OBW : 1.202 MHz	Measured 6 dB Bandwidth: 1.087 MHz Limit: ≥ 500.0 kHz Margin: -0.59 MHz

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



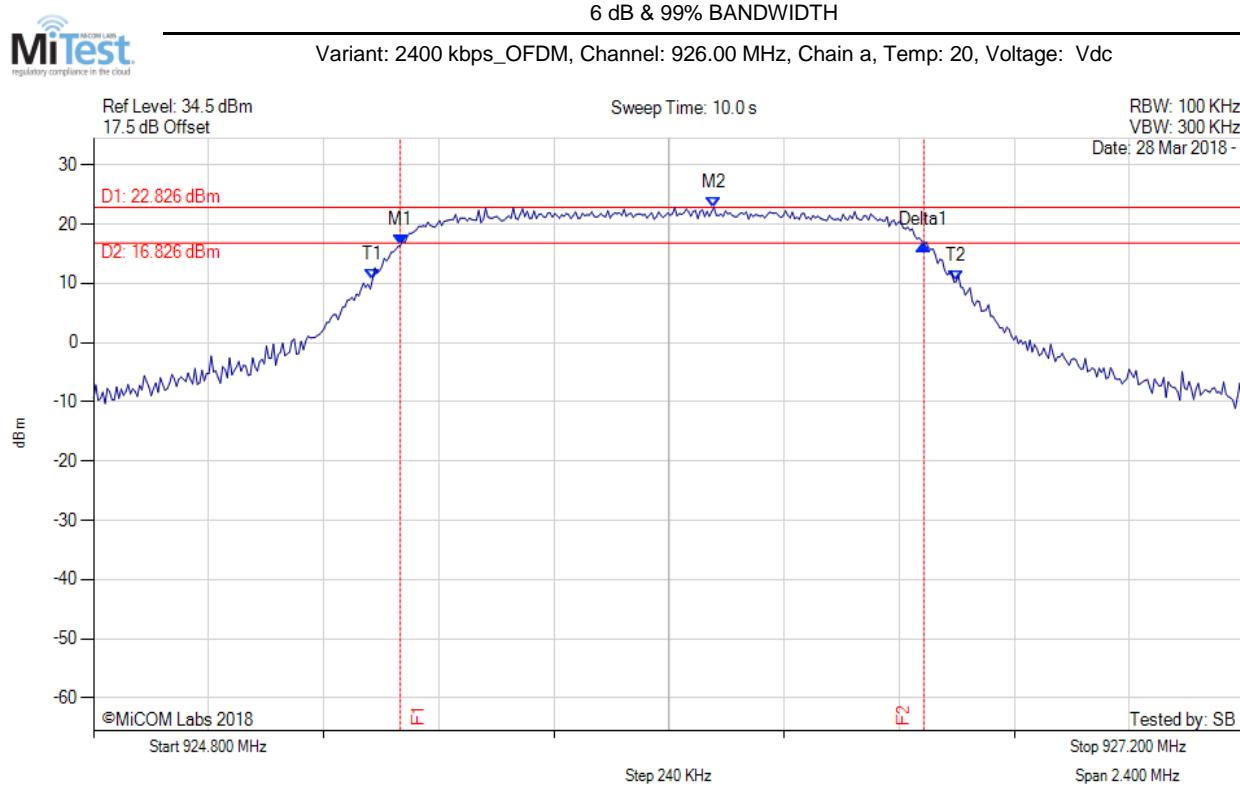
6 dB & 99% BANDWIDTH
 Variant: 2400 kbps_OFDM, Channel: 914.00 MHz, Chain a, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 913.440 MHz : 15.716 dBm M2 : 914.051 MHz : 22.391 dBm Delta1 : 1.092 MHz : 0.260 dB T1 : 913.387 MHz : 11.681 dBm T2 : 914.594 MHz : 9.688 dBm OBW : 1.207 MHz	Measured 6 dB Bandwidth: 1.092 MHz Limit: \geq 500.0 kHz Margin: -0.59 MHz

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

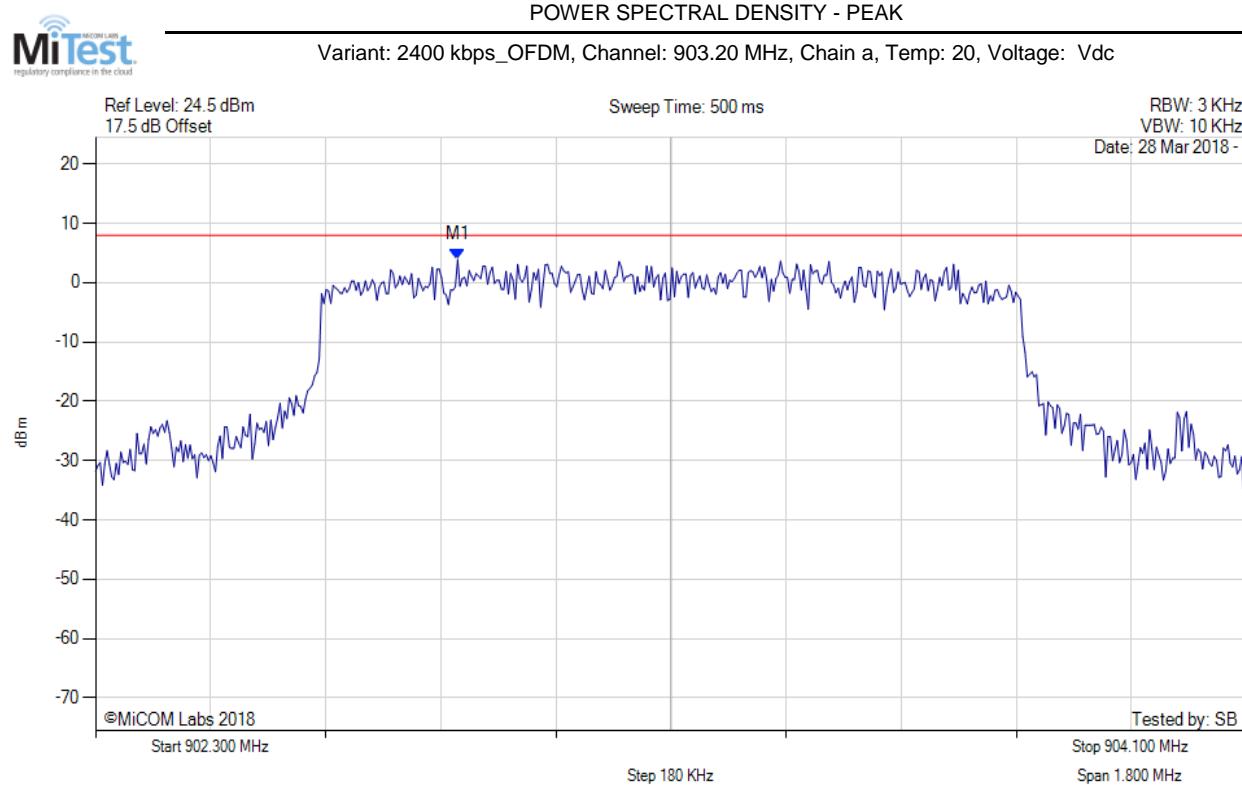


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 925.440 MHz : 16.375 dBm M2 : 926.094 MHz : 22.826 dBm Delta1 : 1.092 MHz : 0.197 dB T1 : 925.382 MHz : 10.717 dBm T2 : 926.599 MHz : 10.319 dBm OBW : 1.217 MHz	Measured 6 dB Bandwidth: 1.092 MHz Limit: \geq 500.0 kHz Margin: -0.59 MHz

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

A.2. Power Spectral Density



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 902.866 MHz : 3.872 dBm	Limit: ≤ 8.000 dBm Margin: -4.13 dB

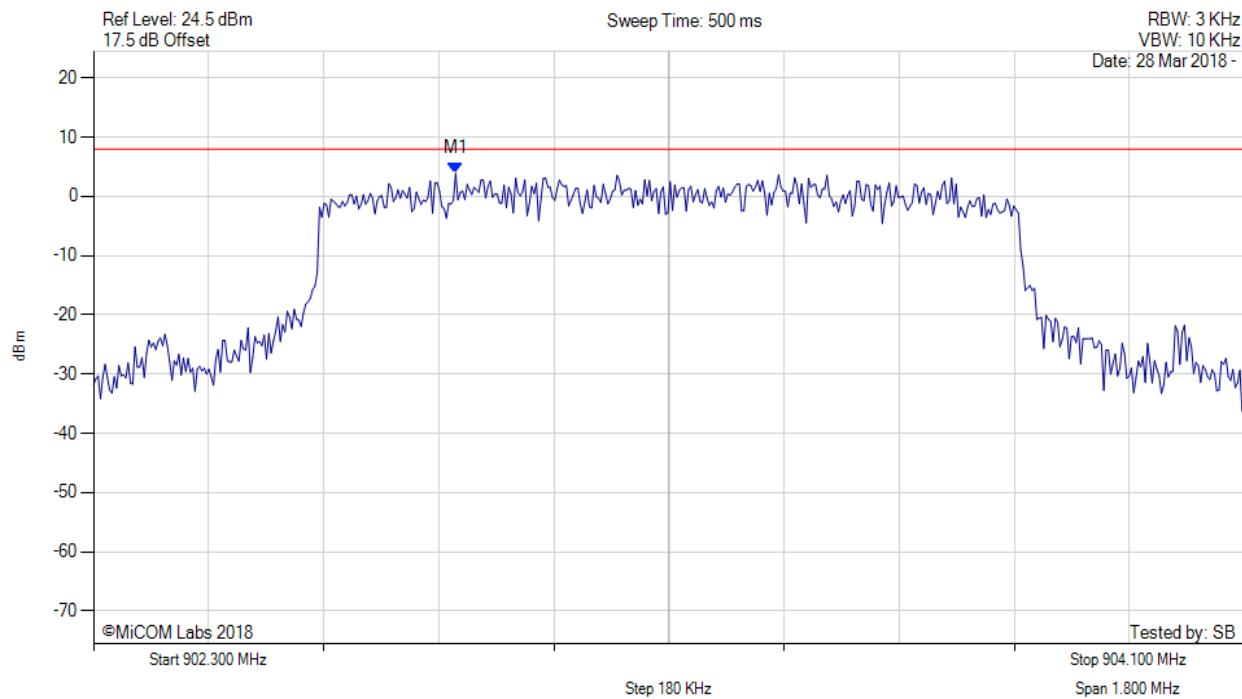
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



POWER SPECTRAL DENSITY - PEAK

Variant: 2400 kbps_OFDM, Channel: 903.20 MHz, SUM, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 902.866 MHz : 3.872 dBm	Limit: ≤ 8.0 dBm Margin: -4.1 dB

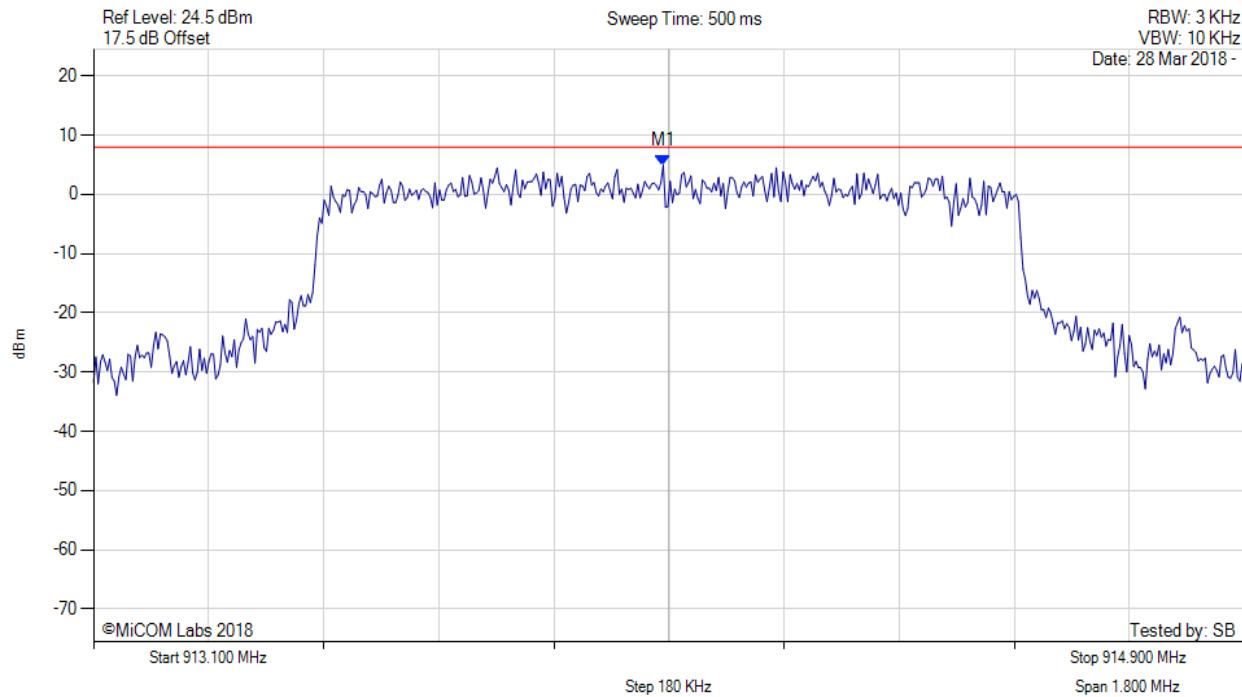
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



POWER SPECTRAL DENSITY - PEAK

Variant: 2400 kbps_OFDM, Channel: 914.00 MHz, Chain a, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 913.991 MHz : 4.905 dBm	Limit: ≤ 8.000 dBm Margin: -3.09 dB

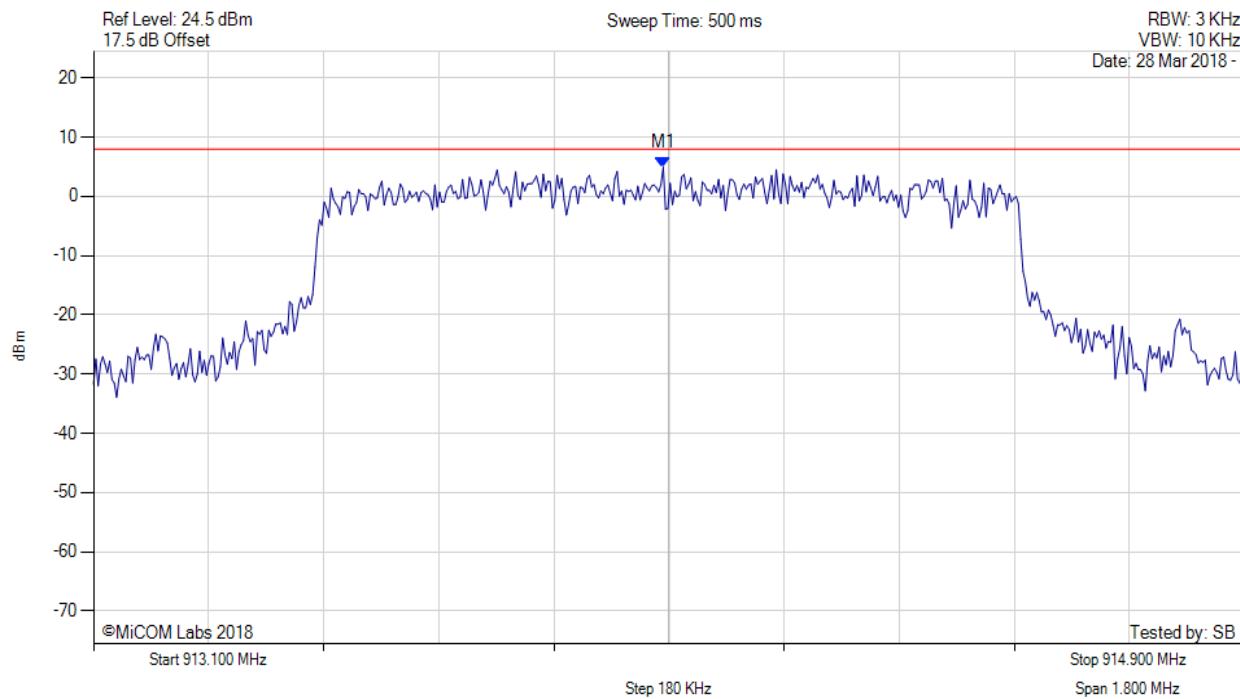
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



POWER SPECTRAL DENSITY - PEAK

Variant: 2400 kbps_OFDM, Channel: 914.00 MHz, SUM, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 913.991 MHz : 4.905 dBm	Limit: ≤ 8.0 dBm Margin: -3.1 dB

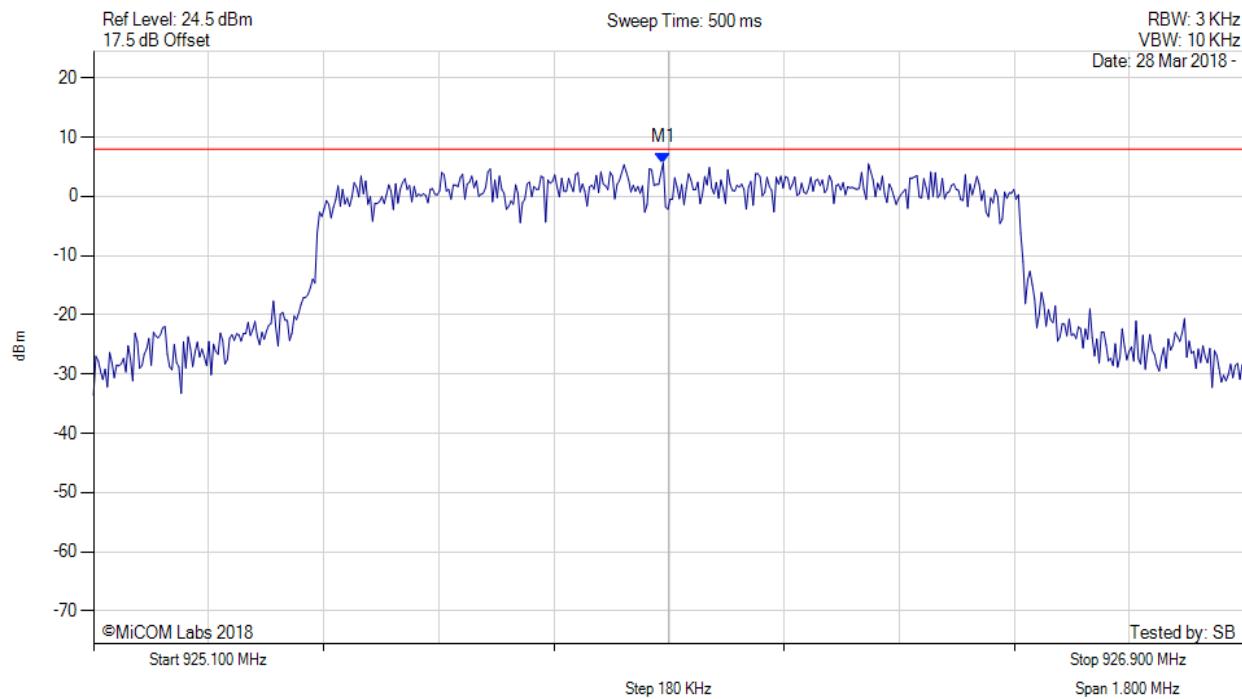
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



POWER SPECTRAL DENSITY - PEAK

Variant: 2400 kbps_OFDM, Channel: 926.00 MHz, Chain a, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 925.991 MHz : 5.653 dBm	Limit: ≤ 8.000 dBm Margin: -2.35 dB

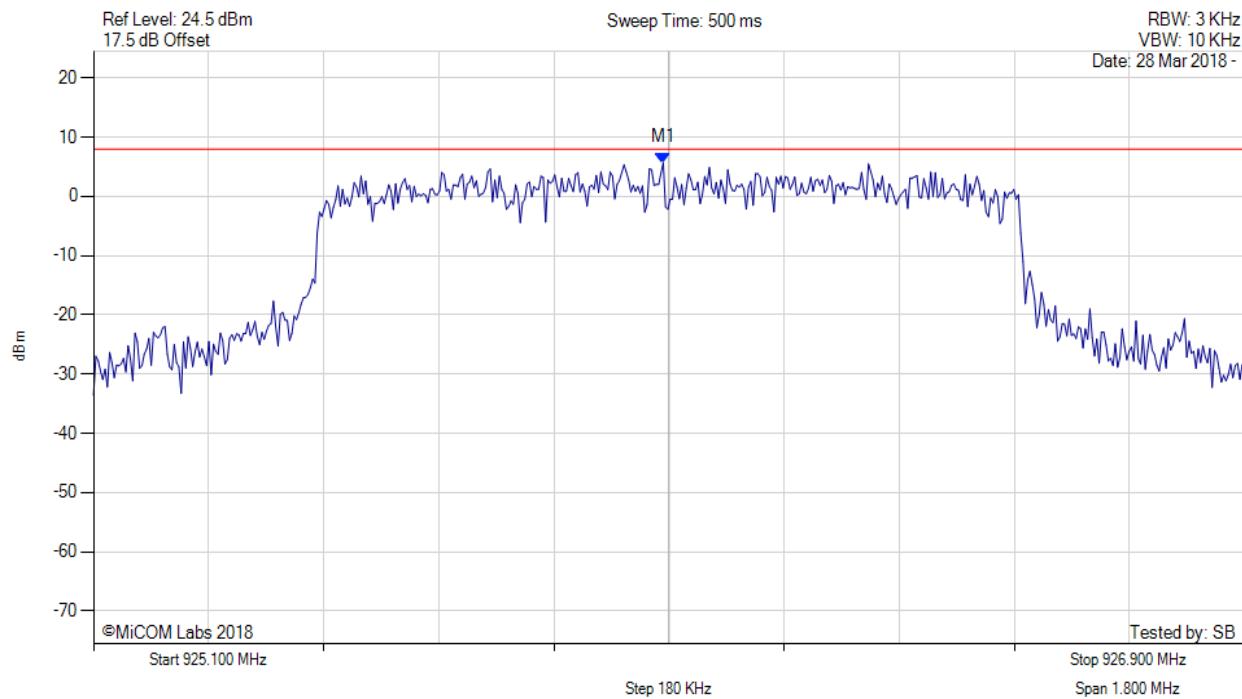
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



POWER SPECTRAL DENSITY - PEAK

Variant: 2400 kbps_OFDM, Channel: 926.00 MHz, SUM, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 925.991 MHz : 5.653 dBm	Limit: ≤ 8.0 dBm Margin: -2.3 dB

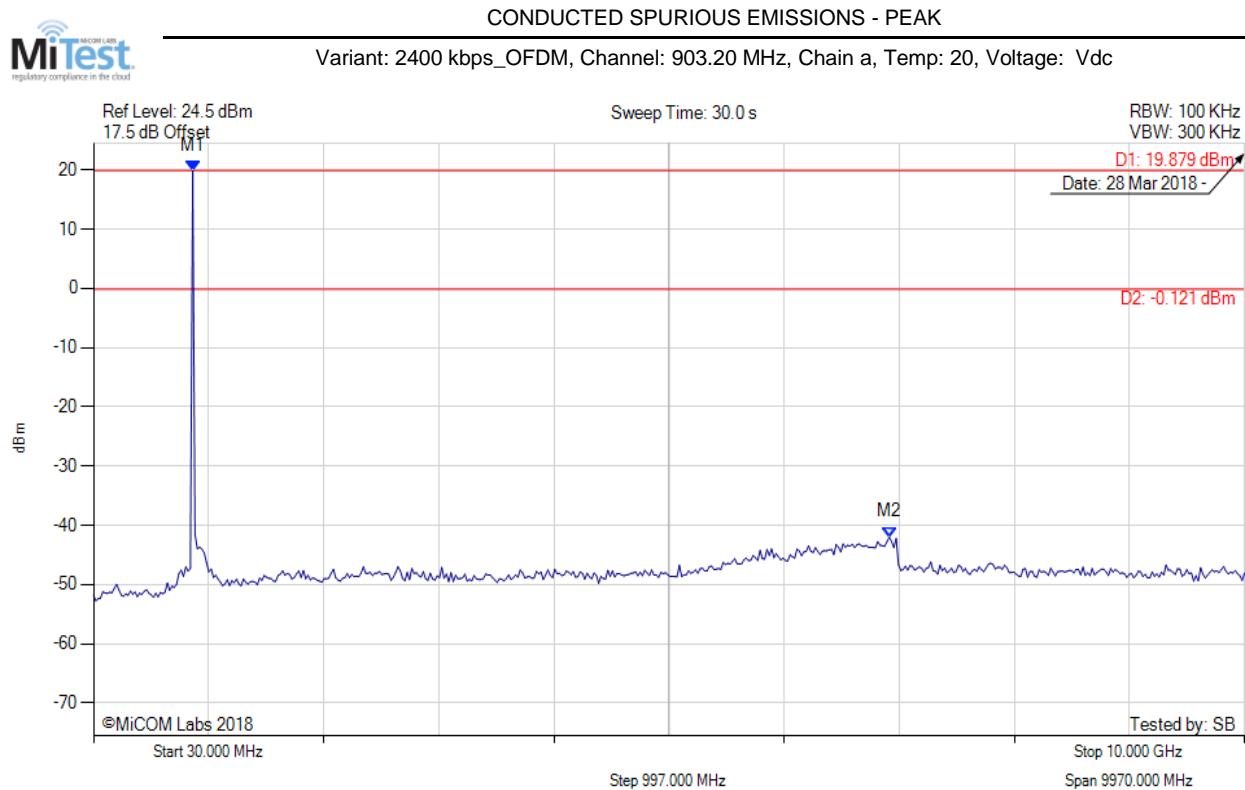
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

A.3. Emissions

A.3.1. Conducted Emissions

A.3.1.1. Conducted Spurious Emissions



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 889.138 MHz : 19.879 dBm M2 : 6923.086 MHz : -42.010 dBm	Limit: -0.12 dBm Margin: -41.89 dB

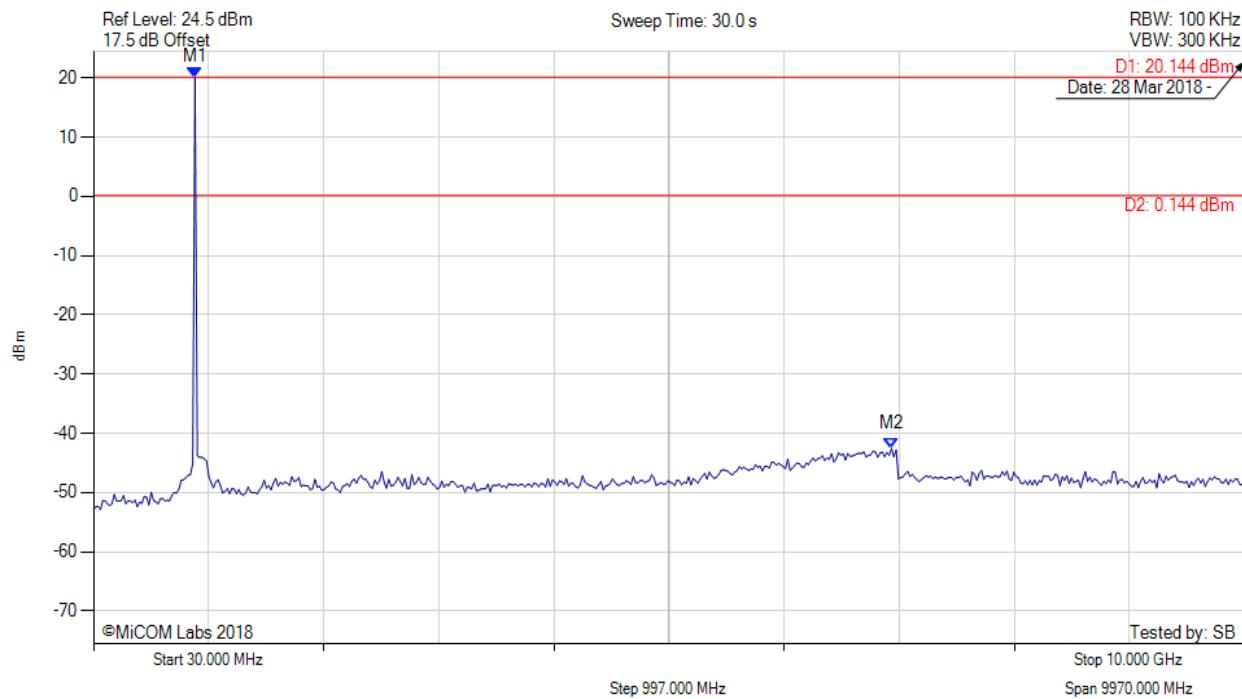
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



CONDUCTED SPURIOUS EMISSIONS - PEAK

Variant: 2400 kbps_OFDM, Channel: 914.00 MHz, Chain a, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 909.118 MHz : 20.144 dBm M2 : 6943.066 MHz : -42.579 dBm	Limit: 0.14 dBm Margin: -42.72 dB

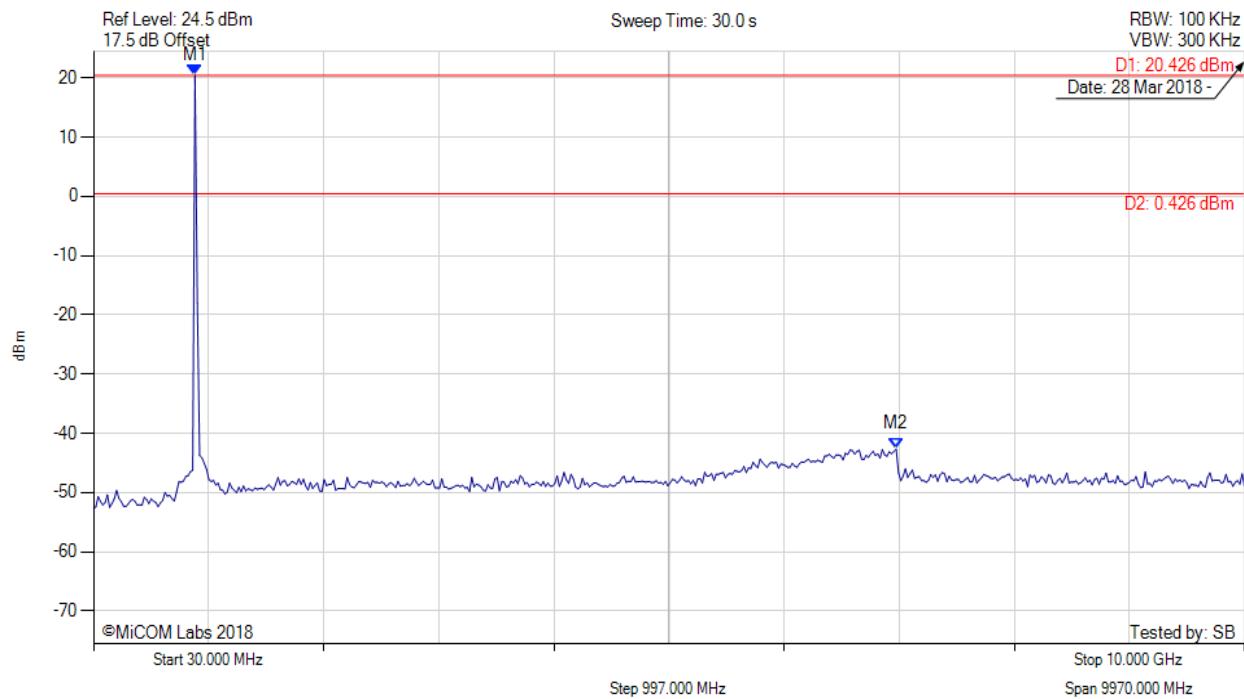
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



CONDUCTED SPURIOUS EMISSIONS - PEAK

Variant: 2400 kbps_OFDM, Channel: 926.00 MHz, Chain a, Temp: 20, Voltage: Vdc

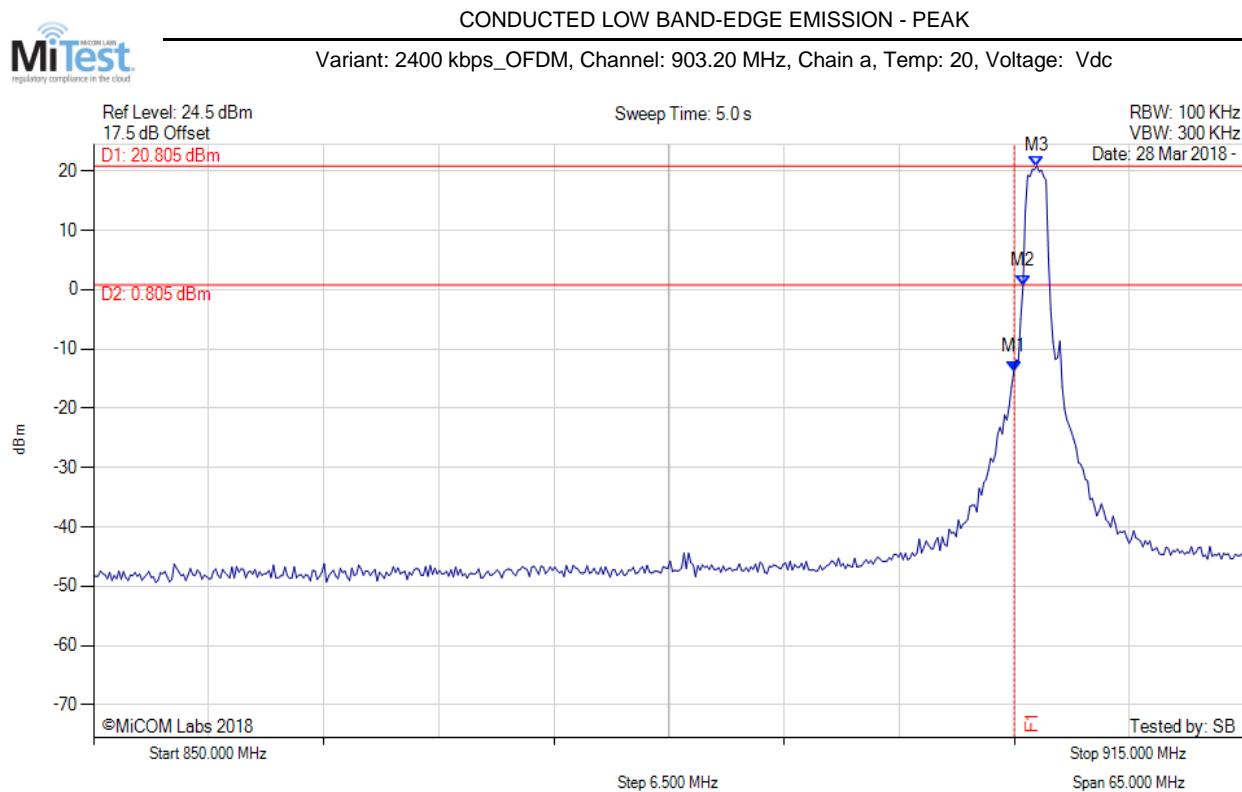


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 909.118 MHz : 20.426 dBm M2 : 6983.026 MHz : -42.664 dBm	Limit: 0.43 dBm Margin: -43.09 dB

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

A.3.1.2. Conducted Band-Edge Emissions



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 902.000 MHz : -13.852 dBm M2 : 902.495 MHz : 0.685 dBm M3 : 903.277 MHz : 20.805 dBm	Channel Frequency: 903.20 MHz

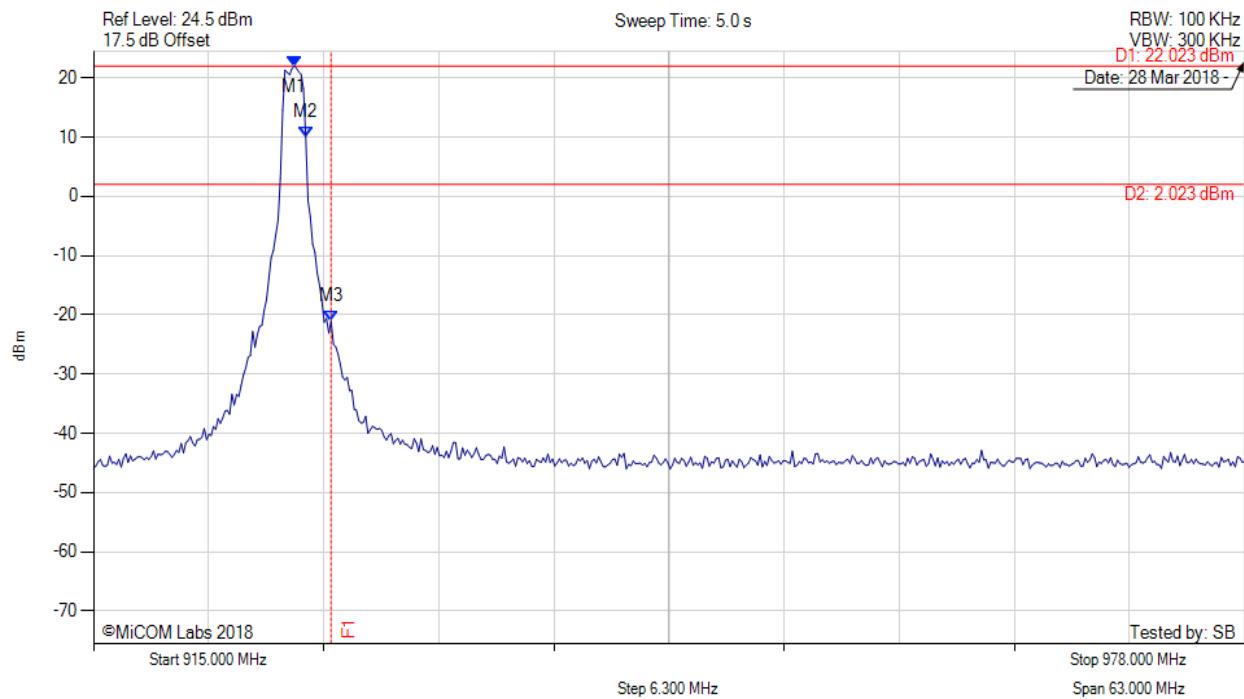
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



CONDUCTED HIGH BAND-EDGE EMISSION - PEAK

Variant: 2400 kbps_OFDM, Channel: 926.00 MHz, Chain a, Temp: 20, Voltage: Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 925.984 MHz : 22.023 dBm M2 : 926.615 MHz : 10.060 dBm M3 : 928.000 MHz : -21.145 dBm	Channel Frequency: 926.00 MHz

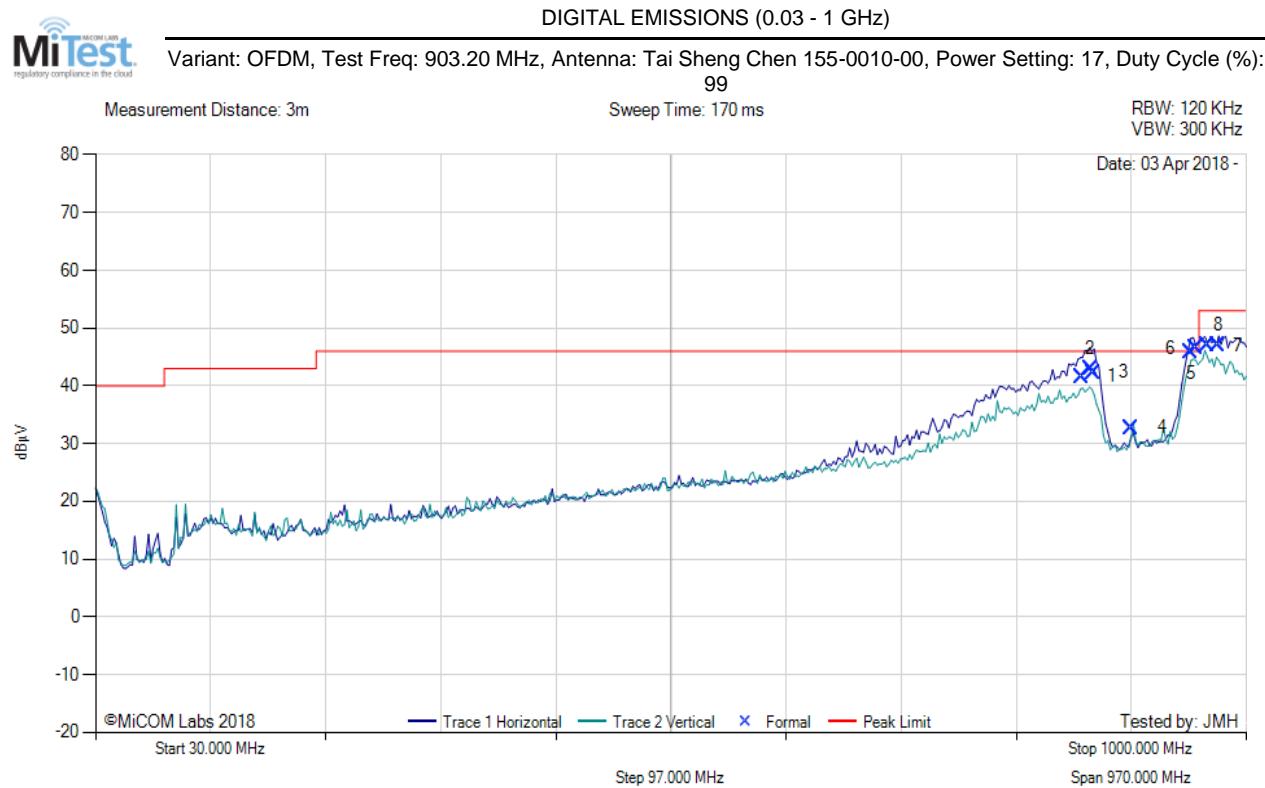
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

A.3.2. Radiated Emissions

Integral Antenna (Tai Sheng Chen 155-0010-00)

30-1000 MHz:



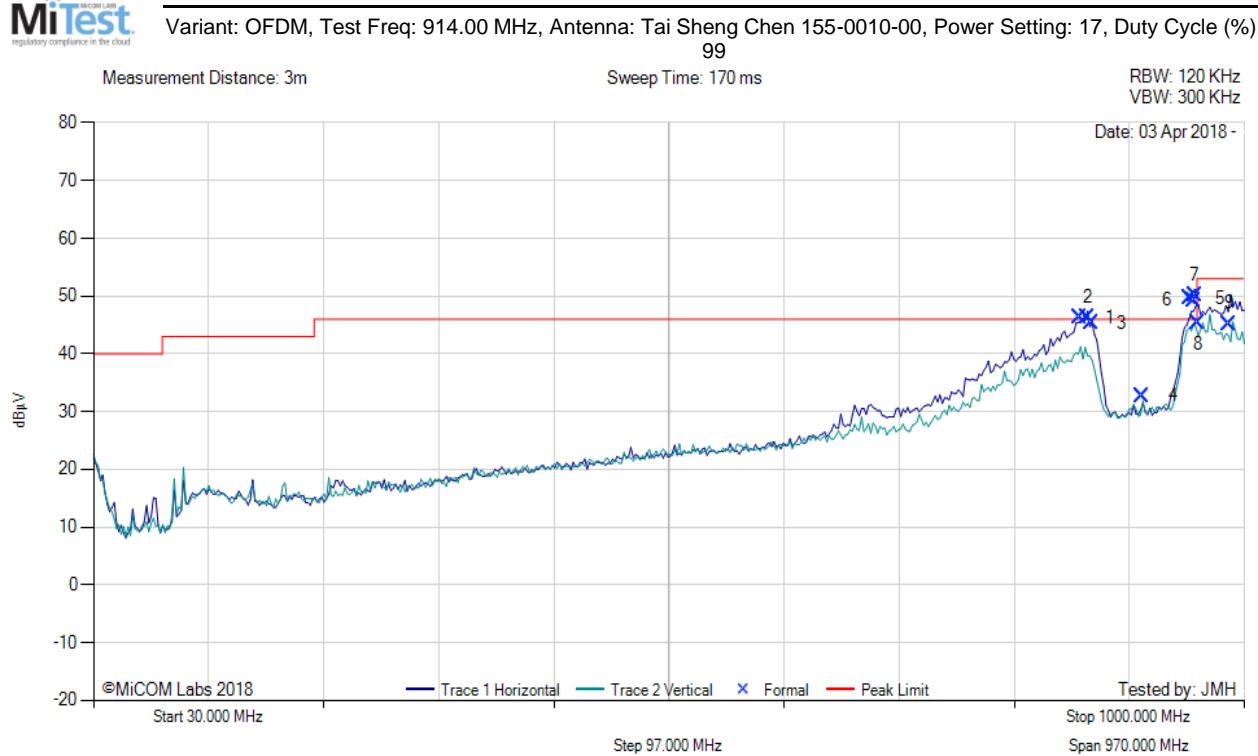
30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail	
1	860.73	43.62	6.13	-8.17	41.58	MaxQP	Horizontal	98	294	46.0	-4.4	Pass	
2	868.56	44.86	6.15	-8.10	42.91	MaxQP	Horizontal	98	277	46.0	-3.1	Pass	
3	871.25	44.04	6.17	-7.90	42.31	MaxQP	Horizontal	100	286	46.0	-3.7	Pass	
4	903.19	34.51	6.24	-8.01	32.74	Fundamental	Vertical	100	360	--	--		
5	953.54	46.66	6.37	-7.26	45.77	NRB	Horizontal	230	338	46.0	--	Pass	
6	957.92	47.28	6.38	-7.08	46.58	NRB	Horizontal	226	337	46.0	--	Pass	
7	966.88	47.64	6.42	-7.09	46.97	MaxQP	Horizontal	223	328	53.0	-6.0	Pass	
8	976.20	47.61	6.45	-7.02	47.04	MaxQP	Horizontal	233	326	53.0	-6.0	Pass	

Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

[back to matrix](#)



DIGITAL EMISSIONS (0.03 - 1 GHz)



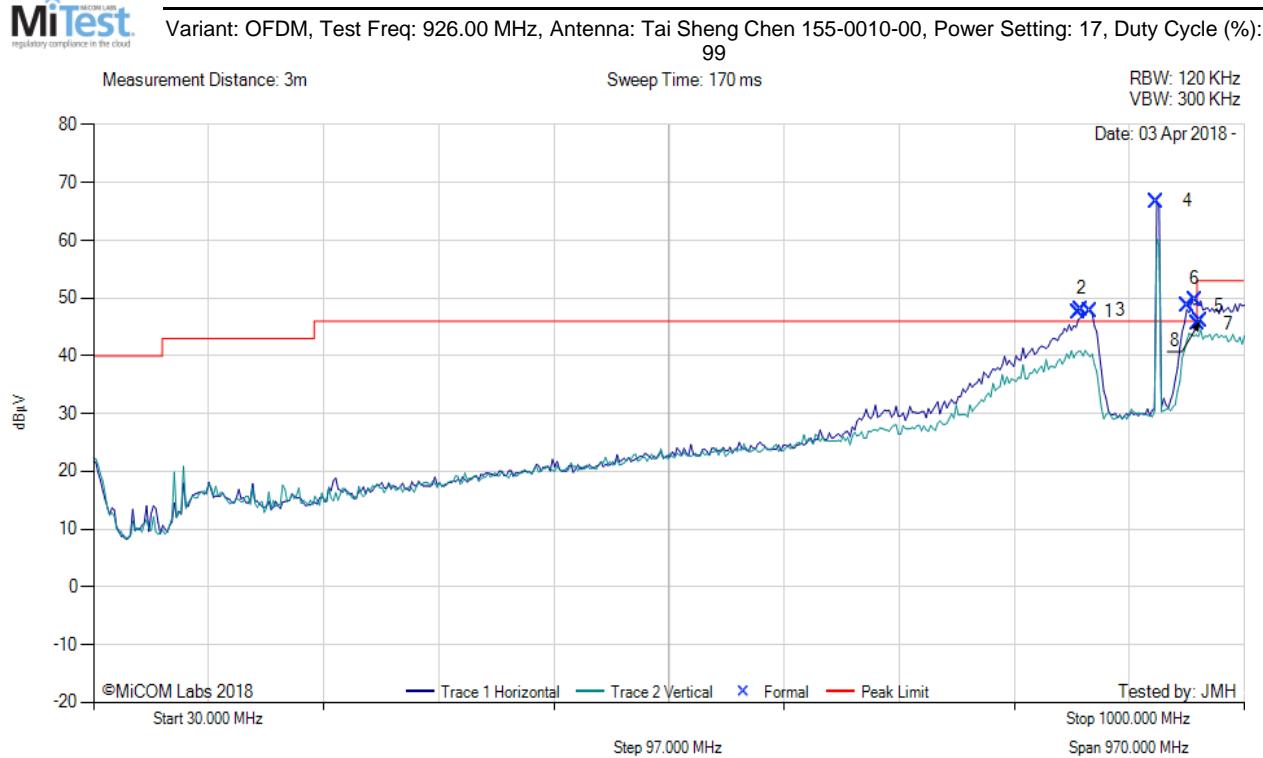
30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
1	860.76	48.25	6.13	-8.17	46.21	Peak (NRB)	Horizontal	100	0	--	--	Pass	
2	867.82	48.19	6.14	-8.11	46.22	Peak (NRB)	Horizontal	100	0	--	--	Pass	
3	871.23	47.03	6.17	-7.90	45.30	Peak (NRB)	Horizontal	100	0	--	--	Pass	
4	914.18	34.30	6.25	-7.82	32.73	Fundamental	Vertical	100	190	--	--		
5	954.23	50.46	6.37	-7.27	49.56	Peak (NRB)	Horizontal	100	0	--	--	Pass	
6	956.93	50.08	6.38	-7.17	49.29	Peak (NRB)	Horizontal	100	0	--	--	Pass	
7	958.22	50.95	6.39	-7.28	50.06	Peak (NRB)	Horizontal	100	0	--	--	Pass	
8	960.95	46.31	6.40	-7.37	45.34	MaxQP	Horizontal	234	327	53.0	-7.7	Pass	
9	987.12	45.54	6.46	-6.76	45.24	MaxQP	Horizontal	214	319	53.0	-7.8	Pass	

Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

[back to matrix](#)



DIGITAL EMISSIONS (0.03 - 1 GHz)



30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
1	860.32	49.62	6.13	-8.17	47.58	Peak (NRB)	Horizontal	100	0	--	--	Pass	
2	862.81	50.05	6.14	-8.15	48.04	Peak (NRB)	Horizontal	100	0	--	--	Pass	
3	869.65	49.80	6.16	-8.10	47.86	Peak (NRB)	Horizontal	100	0	--	--	Pass	
4	926.13	68.16	6.28	-7.67	66.77	Fundamental	Horizontal	100	0	--	--		
5	952.37	49.51	6.37	-7.26	48.62	Peak (NRB)	Horizontal	100	0	--	--	Pass	
6	958.15	50.64	6.39	-7.28	49.75	Peak (NRB)	Horizontal	100	0	--	--	Pass	
7	960.85	46.58	6.40	-7.37	45.61	MaxQP	Horizontal	223	332	53.0	-7.4	Pass	
8	963.00	46.88	6.39	-7.14	46.13	MaxQP	Horizontal	147	337	53.0	-6.9	Pass	

Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

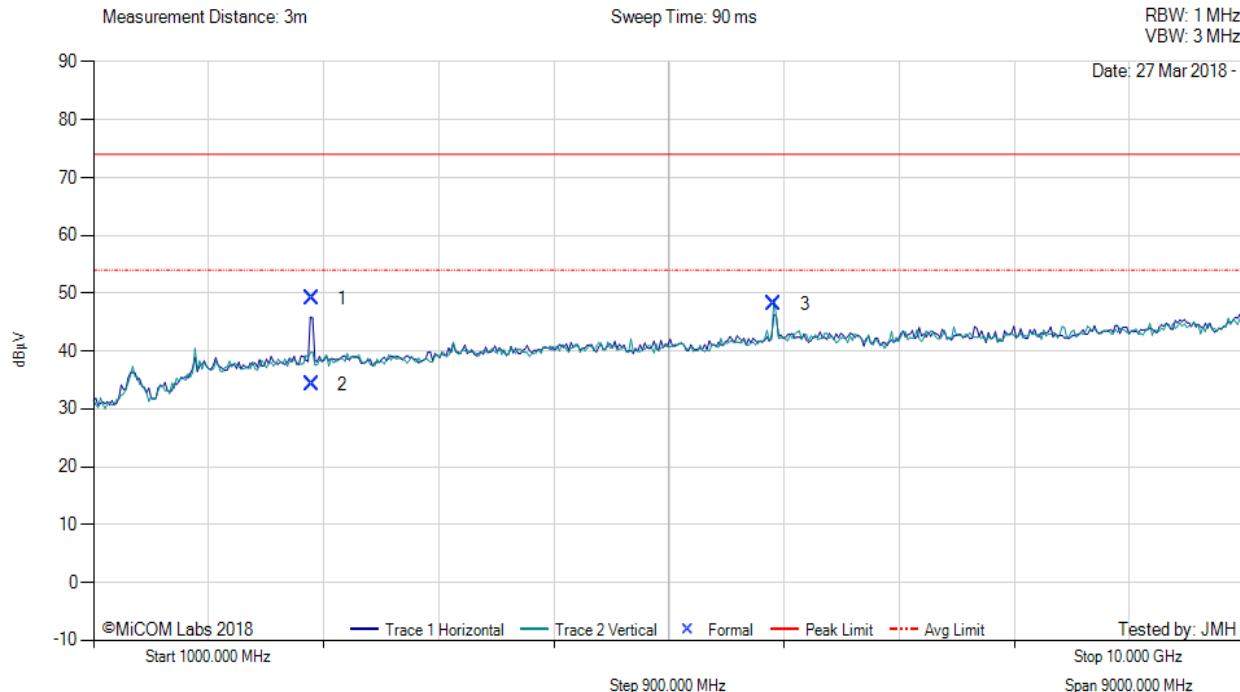
[back to matrix](#)

1-10 GHz



TX SPURIOUS & RESTRICTED BAND EMISSIONS

Variant: OFDM, Test Freq: 903.20 MHz, Antenna: Tai Sheng Chen 155-0010-00, Power Setting: 17, Duty Cycle (%): 99



1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail	
1	2709.60	58.72	2.35	-11.99	49.08	Max Peak	Horizontal	127	307	74.0	-24.9	Pass	
2	2709.60	43.91	2.35	-11.99	34.27	Max Avg	Horizontal	127	307	54.0	-19.7	Pass	
3	6322.02	54.10	3.24	-9.22	48.12	Peak (NRB)	Vertical	100	0	--	--	Pass	

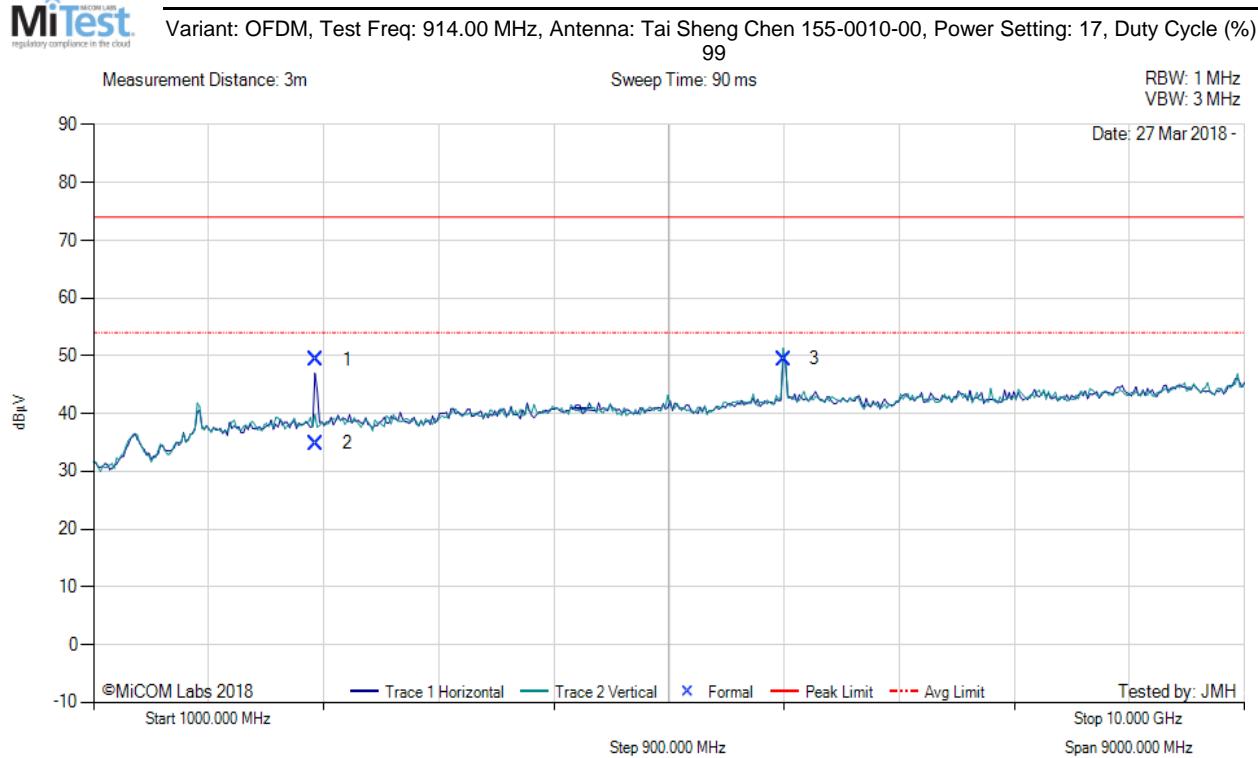
Test Notes: EUT powered by 4 volt DC,

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



TX SPURIOUS & RESTRICTED BAND EMISSIONS



1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
1	2741.88	58.93	2.39	-11.97	49.35	Max Peak	Horizontal	170	310	74.0	-24.7	Pass	
2	2741.88	44.37	2.39	-11.97	34.79	Max Avg	Horizontal	170	310	54.0	-19.2	Pass	
3	6398.68	55.50	3.21	-9.22	49.49	Peak (NRB)	Vertical	100	0	--	--	Pass	

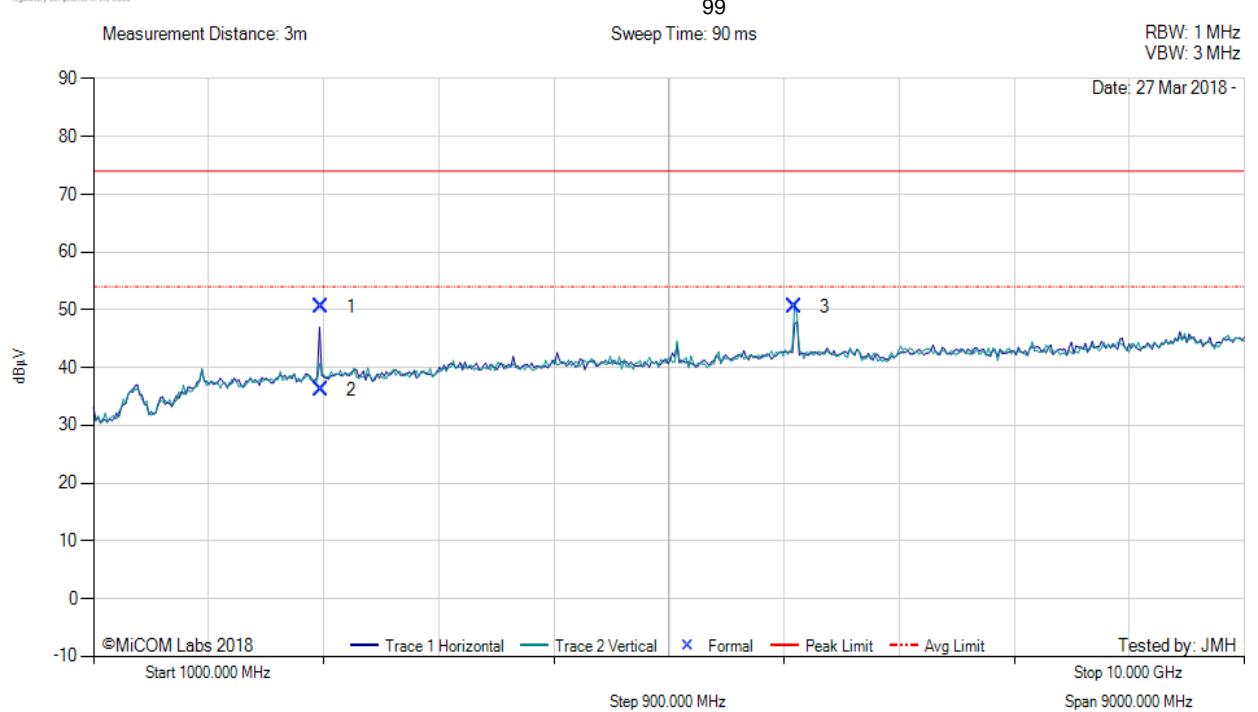
Test Notes: EUT powered by 4 volt DC,

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



TX SPURIOUS & RESTRICTED BAND EMISSIONS



1000.00 - 10000.00 MHz														
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail		
1	2777.92	60.16	2.40	-12.02	50.54	Max Peak	Horizontal	121	305	74.0	-23.5	Pass		
2	2777.92	45.83	2.40	-12.02	36.21	Max Avg	Horizontal	121	305	54.0	-17.8	Pass		
3	6482.08	56.28	3.14	-8.93	50.49	Peak (NRB)	Vertical	100	181	--	--	Pass		

Test Notes: EUT powered by 4 volt DC,

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

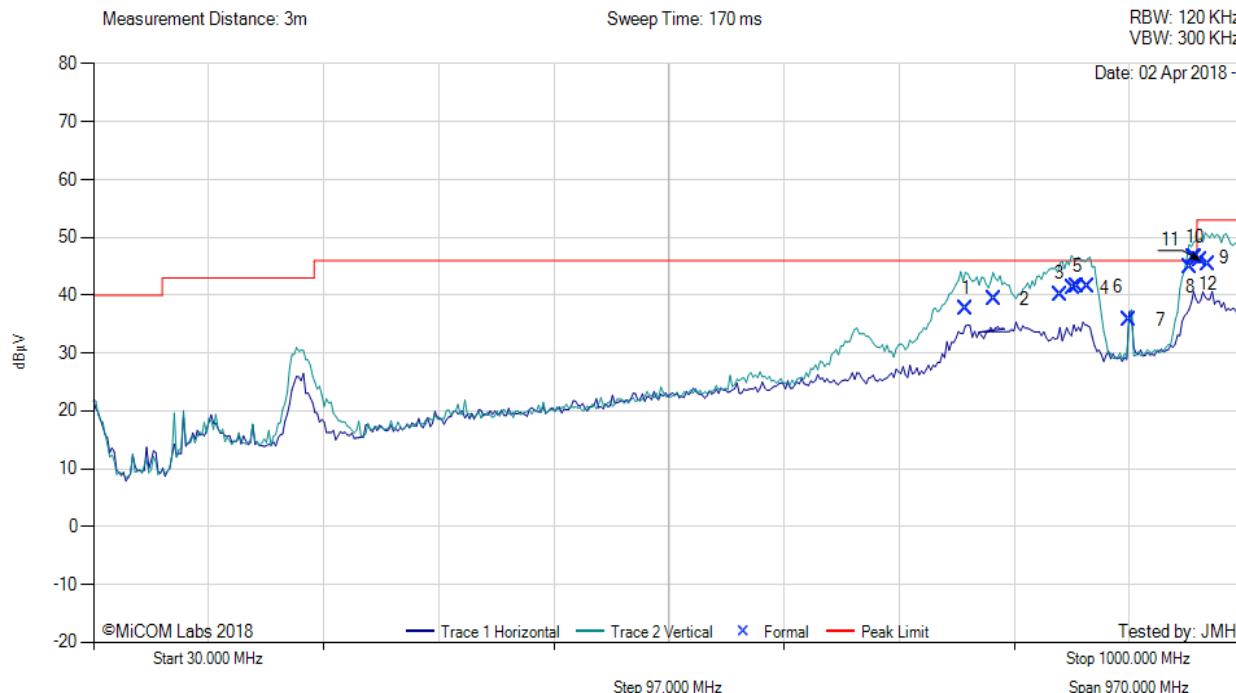
OMNI Antenna (WPANT30017-CA)

30-1000 MHz



DIGITAL EMISSIONS (0.03 - 1 GHz)

Variant: OFDM, Test Freq: 903.20 MHz, Antenna: WP WPANT30017-CA, Power Setting: 17, Duty Cycle (%): 99



30.00 - 1000.00 MHz												
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail
1	764.86	41.40	5.89	-9.57	37.72	MaxQP	Vertical	197	108	46.0	-8.3	Pass
2	789.05	42.38	5.94	-9.05	39.27	MaxQP	Vertical	171	261	46.0	-6.7	Pass
3	844.49	42.41	6.08	-8.33	40.16	MaxQP	Vertical	153	42	46.0	-5.8	Pass
4	856.23	43.30	6.11	-8.21	41.20	MaxQP	Vertical	136	304	46.0	-4.8	Pass
5	859.13	43.58	6.13	-8.18	41.53	MaxQP	Vertical	145	354	46.0	-4.5	Pass
6	867.45	43.42	6.14	-8.11	41.45	MaxQP	Vertical	141	0	46.0	-4.6	Pass
7	903.21	37.43	6.24	-8.01	35.66	Fundamental	Vertical	100	0	--	--	
8	953.94	45.85	6.37	-7.26	44.96	MaxQP	Vertical	149	226	46.0	-1.0	Pass
9	957.35	47.15	6.38	-7.08	46.45	Peak (NRB)	Vertical	100	0	--	--	Pass
10	958.95	47.34	6.39	-7.28	46.45	Peak (NRB)	Vertical	100	0	--	--	Pass
11	963.33	46.80	6.40	-7.23	45.97	MaxQP	Vertical	101	178	53.0	-7.0	Pass
12	969.81	46.00	6.45	-7.06	45.39	MaxQP	Vertical	100	165	53.0	-7.6	Pass

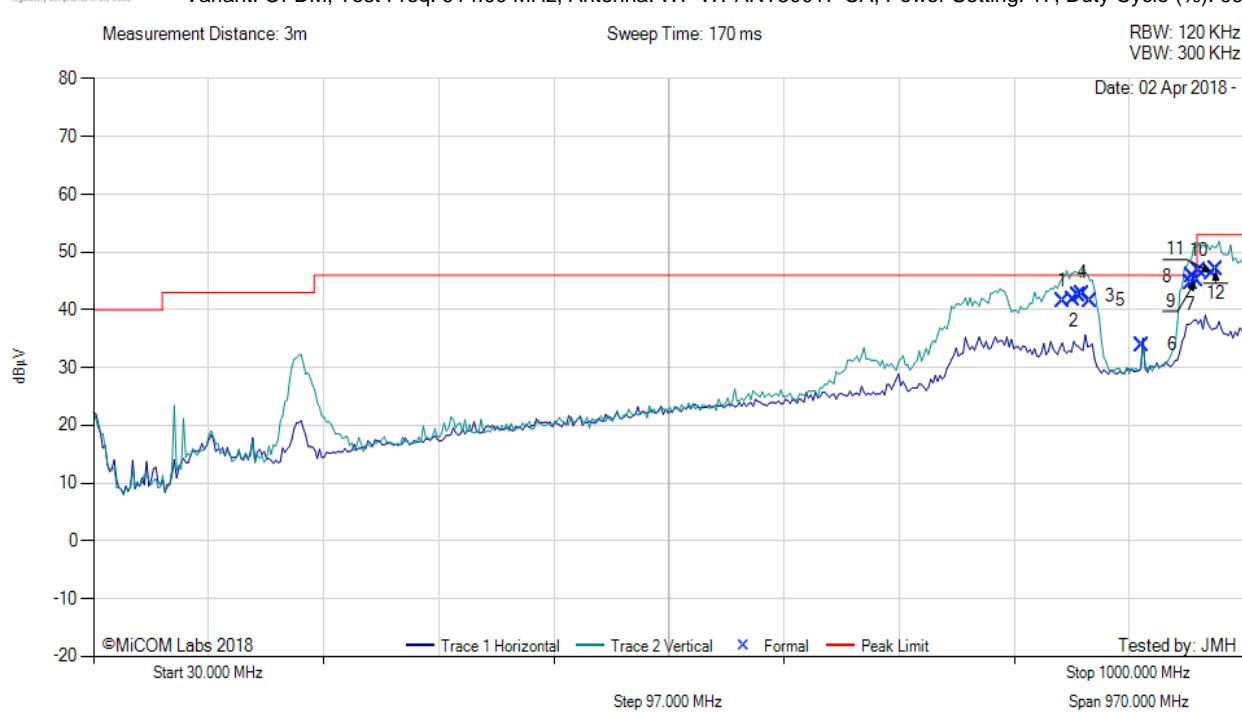
Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overload.

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



DIGITAL EMISSIONS (0.03 - 1 GHz)



30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB _{μV}	Cable Loss dB	AF dB	Level dB _{μV/m}	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB _{μV/m}	Margin dB	Pass /Fail	
1	846.57	43.66	6.08	-8.27	41.47	MaxQP	Vertical	189	202	46.0	-4.5	Pass	
2	856.16	43.78	6.11	-8.21	41.68	MaxQP	Vertical	152	189	46.0	-4.3	Pass	
3	860.46	44.52	6.13	-8.17	42.48	MaxQP	Vertical	128	200	46.0	-3.5	Pass	
4	863.76	44.83	6.13	-8.14	42.82	MaxQP	Vertical	138	189	46.0	-3.2	Pass	
5	869.82	43.52	6.16	-8.10	41.58	MaxQP	Vertical	101	183	46.0	-4.4	Pass	
6	913.93	35.47	6.25	-7.82	33.90	Fundamental	Horizontal	100	197	--	--		
7	954.89	45.51	6.37	-7.27	44.61	MaxQP	Vertical	123	0	46.0	-1.4	Pass	
8	956.55	46.64	6.38	-7.17	45.85	Peak (NRB)	Vertical	100	0	--	--	Pass	
9	959.19	45.92	6.39	-7.18	45.13	Peak (NRB)	Vertical	100	0	--	--	Pass	
10	962.06	47.57	6.39	-7.14	46.82	MaxQP	Vertical	108	211	53.0	-6.2	Pass	
11	972.42	47.02	6.43	-7.10	46.35	MaxQP	Vertical	101	212	53.0	-6.7	Pass	
12	975.79	47.47	6.44	-6.94	46.97	MaxQP	Vertical	189	254	53.0	-6.0	Pass	

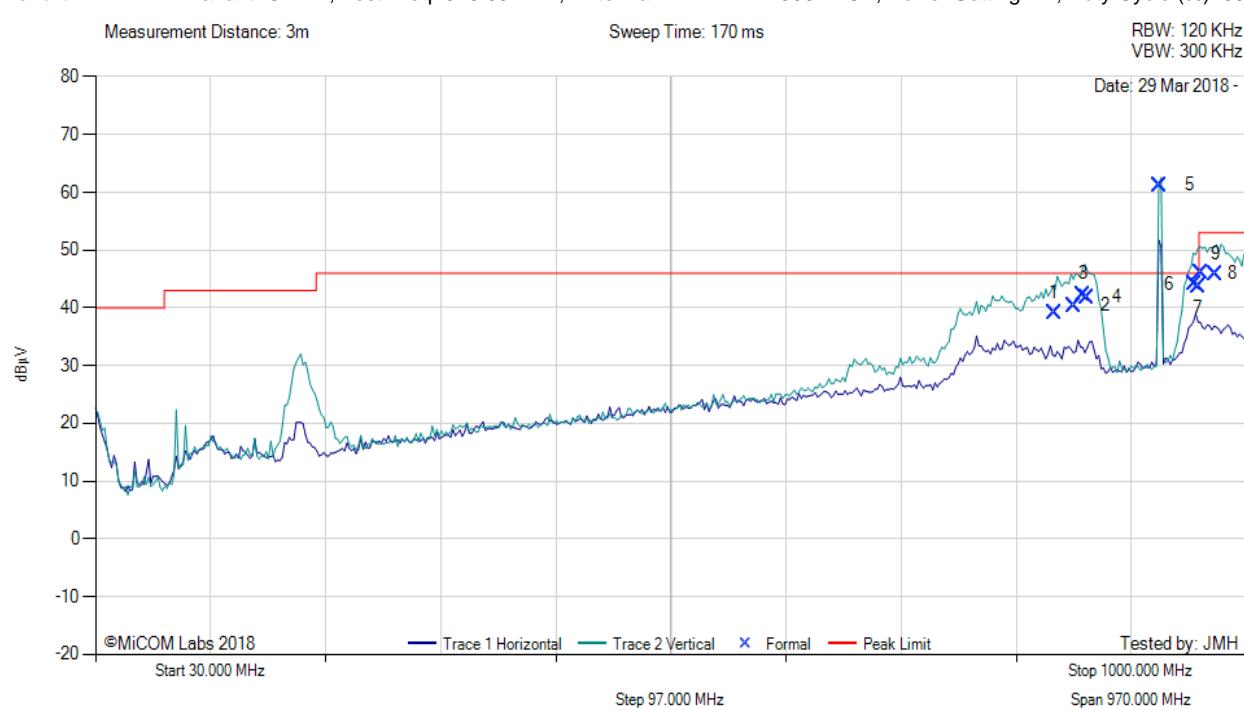
Test Notes: EUT powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



DIGITAL EMISSIONS (0.03 - 1 GHz)



30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
1	837.99	41.59	6.05	-8.56	39.08	MaxQP	Vertical	144	174	46.0	-6.9	Pass	
2	855.07	42.56	6.11	-8.23	40.44	MaxQP	Vertical	152	175	46.0	-5.6	Pass	
3	862.46	44.31	6.14	-8.15	42.30	MaxQP	Vertical	150	188	46.0	-3.7	Pass	
4	865.87	43.74	6.13	-8.03	41.84	MaxQP	Vertical	98	179	46.0	-4.2	Pass	
5	926.48	62.68	6.28	-7.67	61.29	Fundamental	Vertical	100	0	--	--		
6	956.53	44.94	6.38	-7.17	44.15	MaxQP	Vertical	112	20	46.0	-1.9	Pass	
7	959.07	44.48	6.39	-7.18	43.69	MaxQP	Vertical	109	4	46.0	-2.3	Pass	
8	962.27	46.80	6.39	-7.14	46.05	MaxQP	Vertical	185	235	53.0	-7.0	Pass	
9	973.73	46.31	6.43	-6.98	45.76	MaxQP	Vertical	205	254	53.0	-7.2	Pass	

Test Notes: EUT powered by 4V DC.. 900 MHz notch in front of amp to prevent overload.

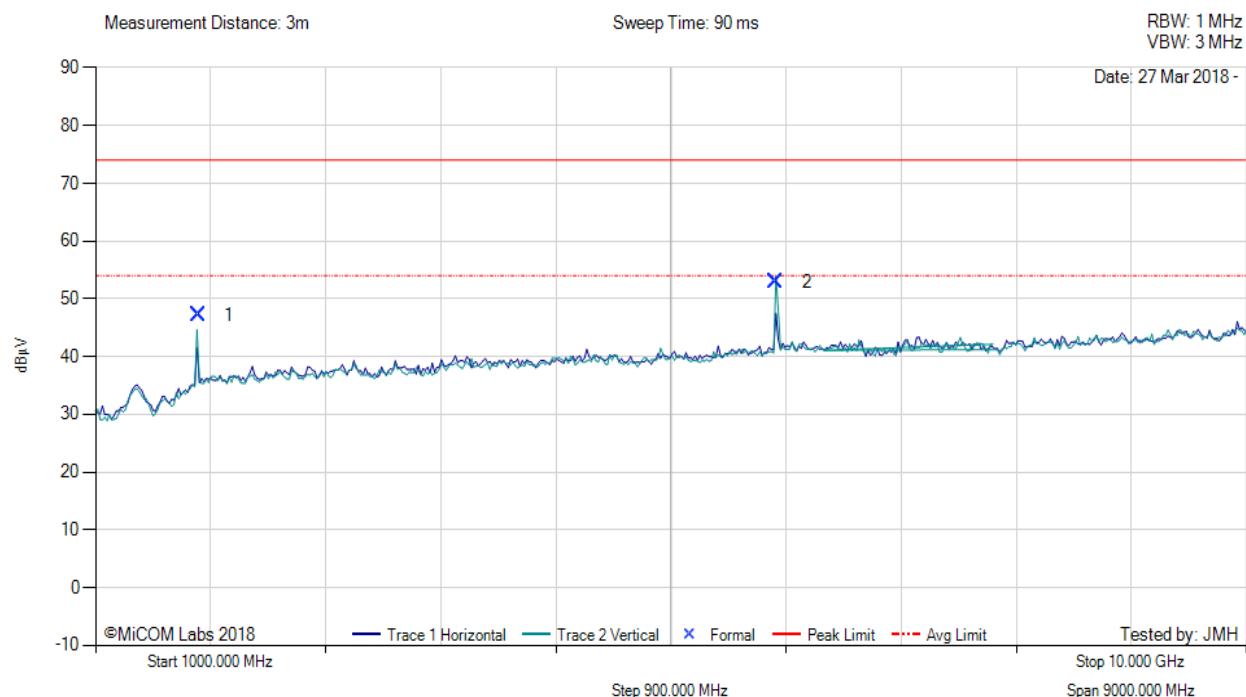
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

1-10 GHz



TX SPURIOUS & RESTRICTED BAND EMISSIONS
 Variant: OFDM, Test Freq: 903.20 MHz, Antenna: WP WPANT30017-CA, Power Setting: 17, Duty Cycle (%): 99



1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
1	1806.36	59.58	2.03	-14.43	47.18	Peak (NRB)	Vertical	151	200	--	--	Pass	
2	6322.96	58.91	3.24	-9.22	52.93	Peak (NRB)	Vertical	151	156	--	--	Pass	

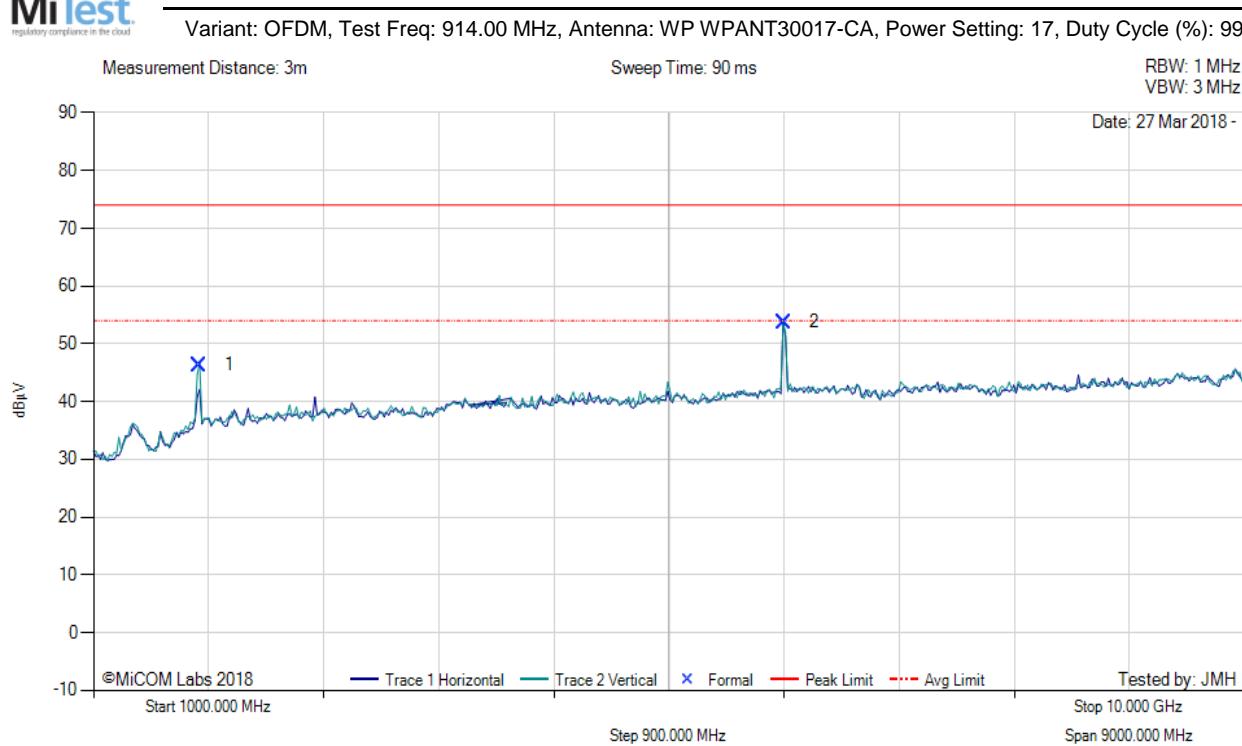
Test Notes: EUT powered by 4 volt DC,

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



TX SPURIOUS & RESTRICTED BAND EMISSIONS



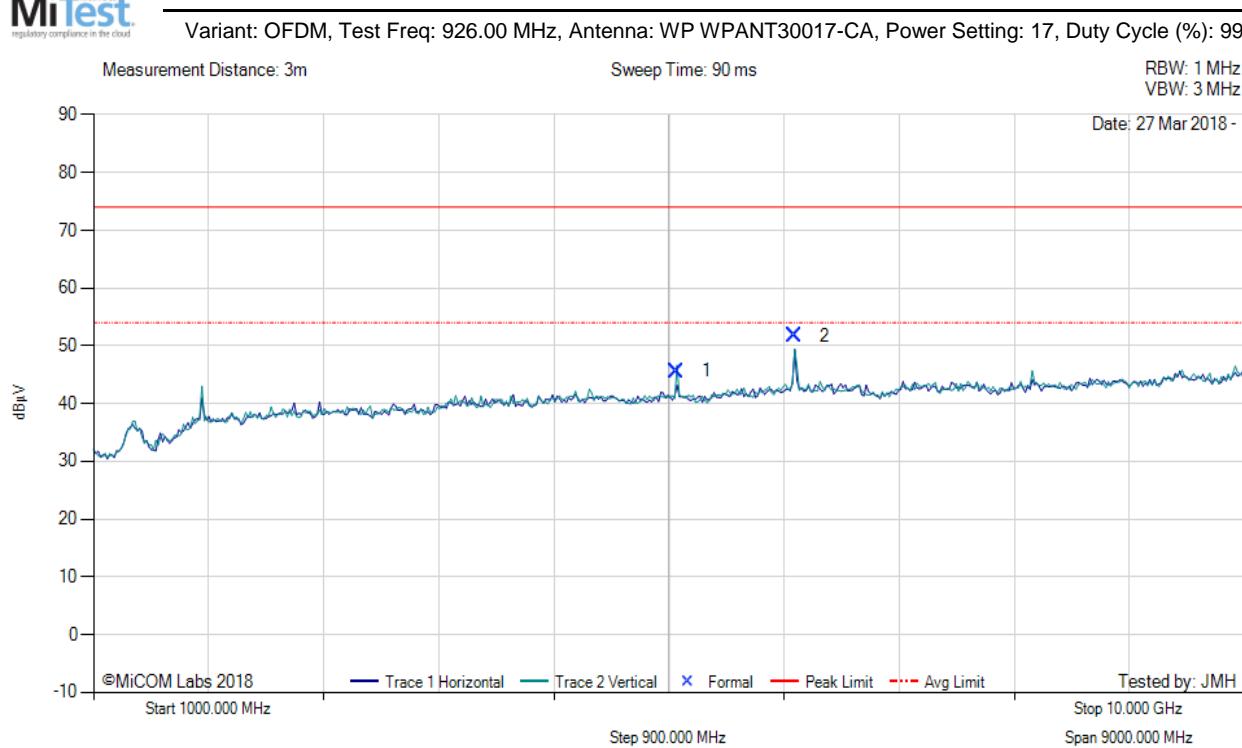
1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail	
1	1828.07	58.38	2.02	-14.05	46.35	Peak (NRB)	Vertical	151	14	--	--	Pass	
2	6397.47	59.76	3.21	-9.23	53.74	Peak (NRB)	Horizontal	200	257	--	--	Pass	

Test Notes: EUT powered by 4 volt DC,

[back to matrix](#)



TX SPURIOUS & RESTRICTED BAND EMISSIONS



1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail	
1	5555.67	53.82	3.15	-11.33	45.64	Peak (NRB)	Vertical	100	0	--	--	Pass	
2	6482.18	57.49	3.14	-8.93	51.70	Peak (NRB)	Vertical	100	0	--	--	Pass	

Test Notes: EUT powered by 4 volt DC,

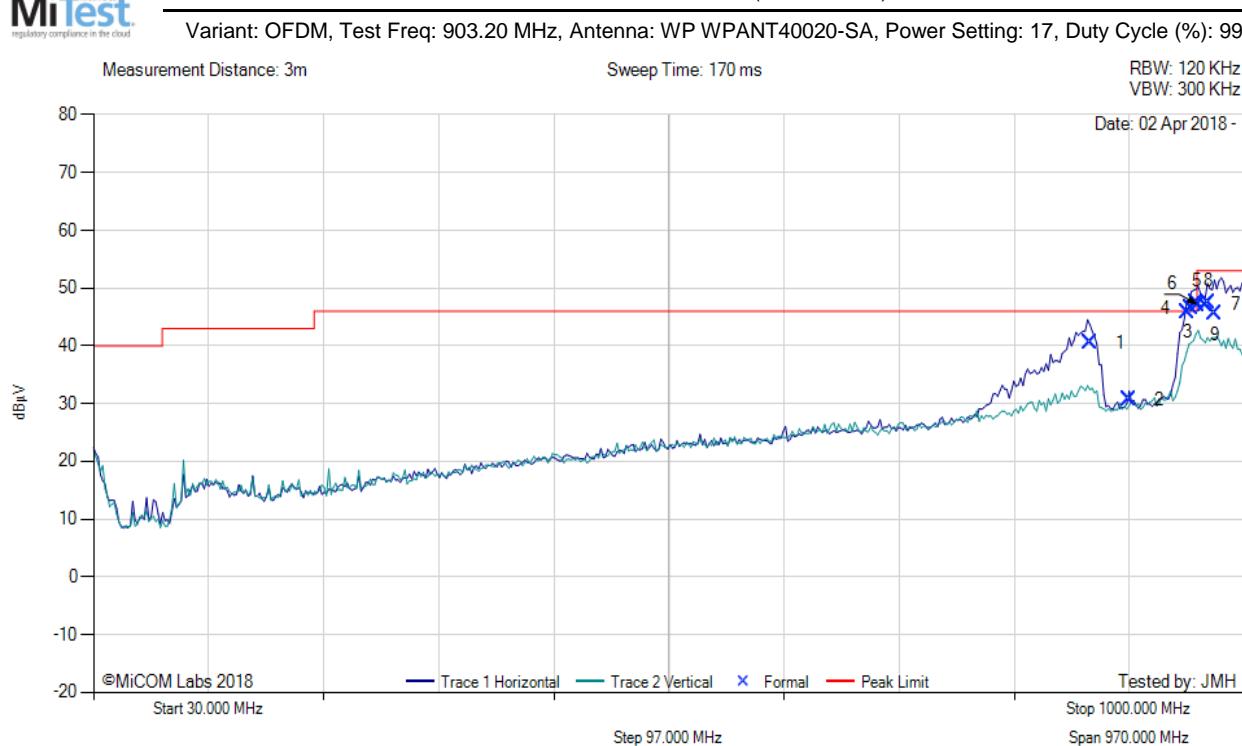
[back to matrix](#)

Wrap Antenna (WPANT40020-SA)

30-1000 MHz



DIGITAL EMISSIONS (0.03 - 1 GHz)



30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
1	870.01	42.39	6.17	-8.10	40.46	MaxQP	Horizontal	189	203	46.0	-5.5	Pass	
2	902.88	32.48	6.24	-8.01	30.71	Fundamental	Horizontal	150	0	--	--		
3	952.04	46.84	6.37	-7.26	45.95	MaxQP	Horizontal	150	182	46.0	-0.1	Pass	
4	955.27	47.25	6.37	-7.17	46.45	Peak (NRB)	Horizontal	100	0	--	--	Pass	
5	959.67	48.41	6.39	-7.18	47.62	Peak (NRB)	Horizontal	100	0	--	--	Pass	
6	960.64	48.12	6.40	-7.37	47.15	MaxQP	Horizontal	161	168	53.0	-5.9	Pass	
7	967.46	47.96	6.44	-7.27	47.13	MaxQP	Horizontal	161	166	53.0	-5.9	Pass	
8	969.38	48.23	6.45	-7.06	47.62	MaxQP	Horizontal	159	172	53.0	-5.4	Pass	
9	975.29	46.02	6.44	-6.94	45.52	MaxQP	Horizontal	169	181	53.0	-7.5	Pass	

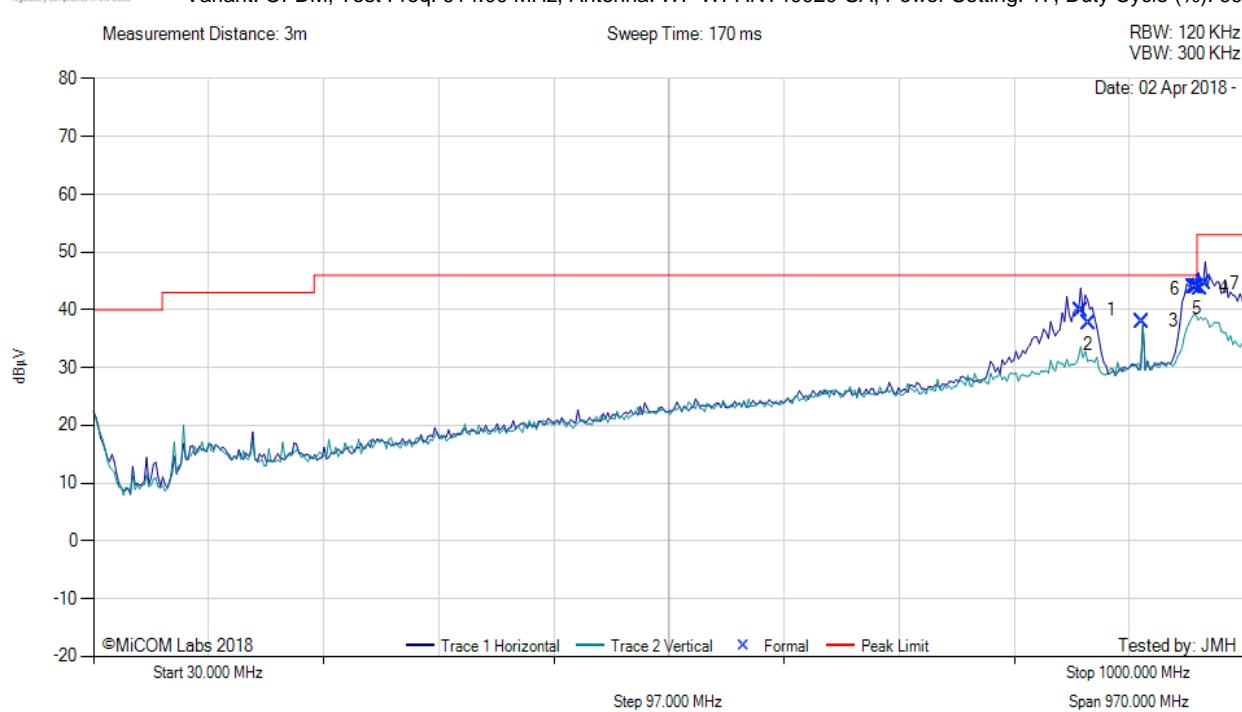
Test Notes: Powered by 4V DC. 900 MHz notch in front of amp to prevent overload.

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



DIGITAL EMISSIONS (0.03 - 1 GHz)



30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
1	862.06	41.97	6.14	-8.15	39.96	MaxQP	Horizontal	184	202	46.0	-6.0	Pass	
2	868.45	39.58	6.15	-8.10	37.63	MaxQP	Horizontal	120	210	46.0	-8.4	Pass	
3	913.99	39.61	6.25	-7.82	38.04	Fundamental	Horizontal	100	214	--	--		
4	956.90	44.69	6.38	-7.17	43.90	MaxQP	Horizontal	157	173	46.0	-2.1	Pass	
5	959.77	44.62	6.39	-7.18	43.83	MaxQP	Horizontal	162	179	46.0	-2.2	Pass	
6	962.63	44.46	6.39	-7.14	43.71	MaxQP	Horizontal	159	179	53.0	-9.3	Pass	
7	966.05	45.27	6.42	-7.09	44.60	MaxQP	Horizontal	105	175	53.0	-8.4	Pass	

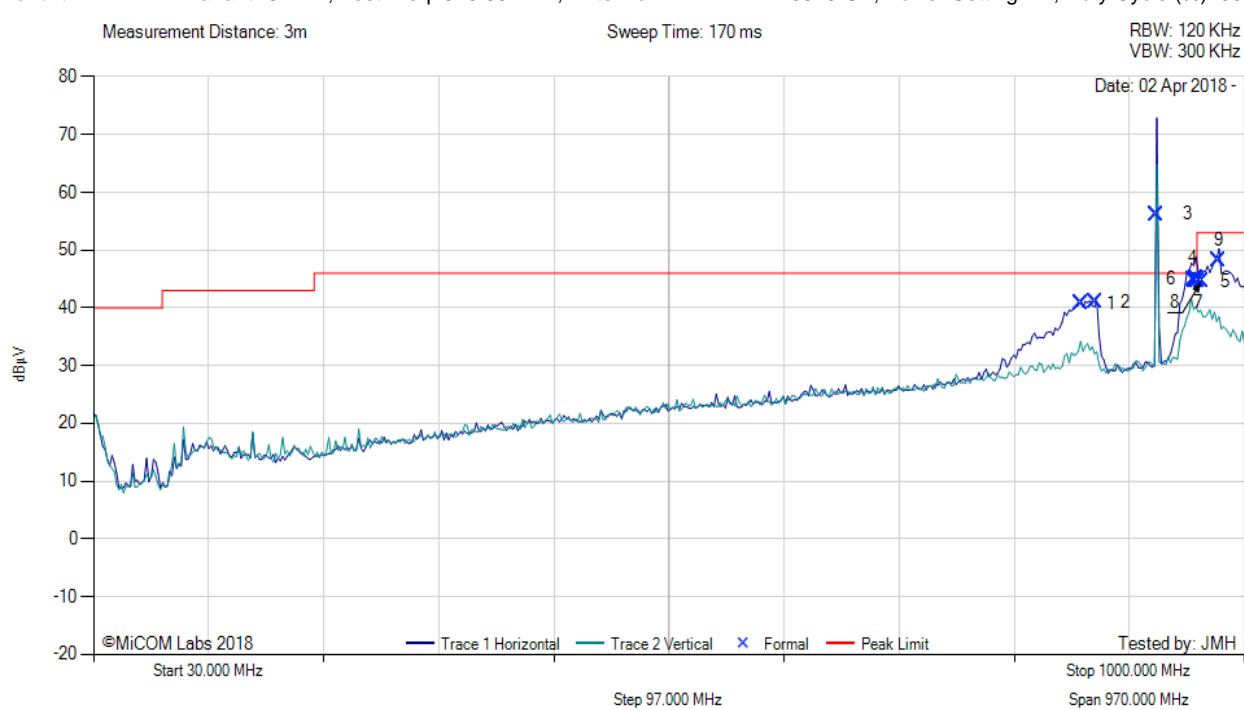
Test Notes: Powered by 4V DC. 900 MHz notch placed in front of amp to prevent overload.

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



DIGITAL EMISSIONS (0.03 - 1 GHz)



30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB _{μV}	Cable Loss dB	AF dB	Level dB _{μV/m}	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB _{μV/m}	Margin dB	Pass /Fail	
1	861.98	42.77	6.14	-8.16	40.75	MaxQP	Horizontal	118	171	46.0	-5.3	Pass	
2	873.98	42.95	6.17	-8.10	41.02	MaxQP	Horizontal	118	201	46.0	-5.0	Pass	
3	926.08	57.58	6.28	-7.67	56.19	Fundamental	Horizontal	100	0	--	--		
4	956.98	45.77	6.38	-7.17	44.98	MaxQP	Horizontal	157	184	46.0	-1.0	Pass	
5	958.05	45.47	6.39	-7.28	44.58	MaxQP	Horizontal	231	191	46.0	-1.4	Pass	
6	959.92	45.82	6.39	-7.18	45.03	MaxQP	Horizontal	162	185	46.0	-1.0	Pass	
7	960.50	45.52	6.40	-7.37	44.55	MaxQP	Horizontal	170	185	53.0	-8.5	Pass	
8	963.40	45.37	6.40	-7.23	44.54	MaxQP	Horizontal	154	195	53.0	-8.5	Pass	
9	977.99	48.81	6.46	-7.00	48.27	MaxQP	Horizontal	104	186	53.0	-4.7	Pass	

Test Notes: Powered by 4V DC. 900 MHz notch in front of amp.

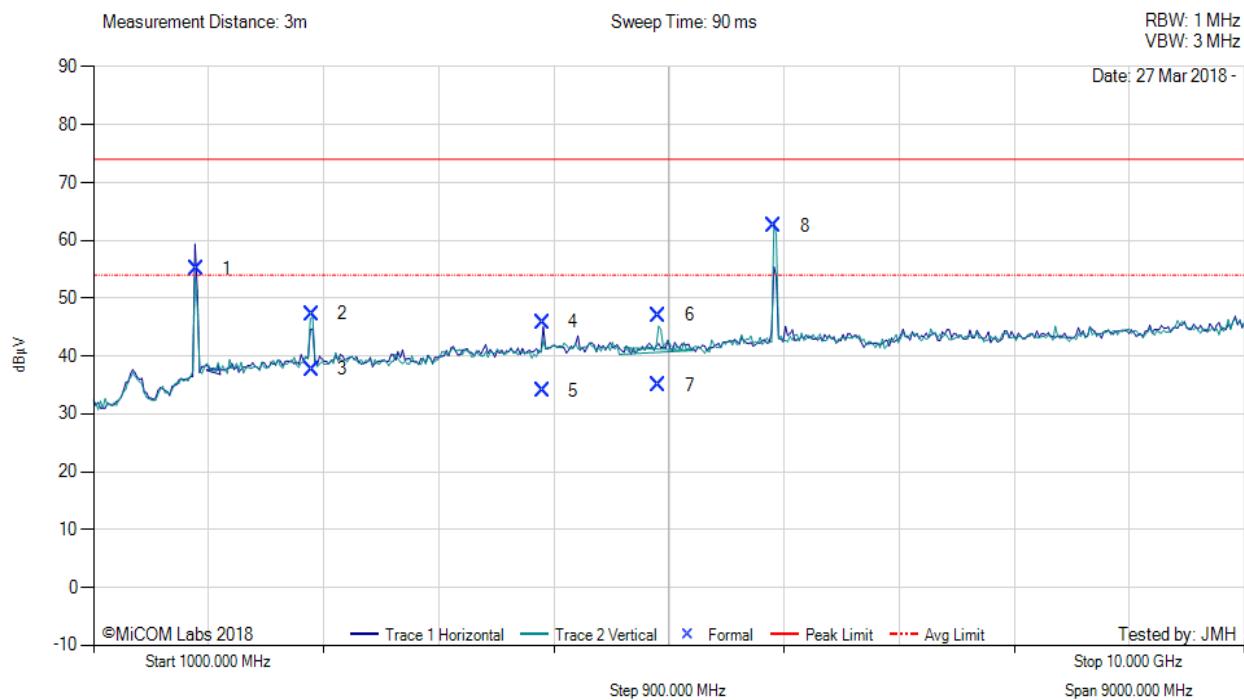
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

1-10 GHz



TX SPURIOUS & RESTRICTED BAND EMISSIONS
 Variant: OFDM, Test Freq: 903.20 MHz, Antenna: WP WPANT40020-SA, Power Setting: 17, Duty Cycle (%): 99



1000.00 - 10000.00 MHz														
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail		
1	1806.54	67.50	2.03	-14.43	55.10	Peak (NRB)	Horizontal	150	173	--	--	Pass		
2	2709.78	56.95	2.35	-11.99	47.31	Max Peak	Vertical	185	120	74.0	-26.7	Pass		
3	2709.78	47.38	2.35	-11.99	37.74	Max Avg	Vertical	185	120	54.0	-16.3	Pass		
4	4515.90	54.89	2.90	-11.93	45.86	Max Peak	Horizontal	150	70	74.0	-28.1	Pass		
5	4515.90	43.03	2.90	-11.93	34.00	Max Avg	Horizontal	150	70	54.0	-20.0	Pass		
6	5419.45	55.71	3.12	-11.74	47.09	Max Peak	Vertical	166	167	74.0	-26.9	Pass		
7	5419.45	43.54	3.12	-11.74	34.92	Max Avg	Vertical	166	167	54.0	-19.1	Pass		
8	6322.46	68.47	3.24	-9.22	62.49	Peak (NRB)	Vertical	150	173	--	--	Pass		

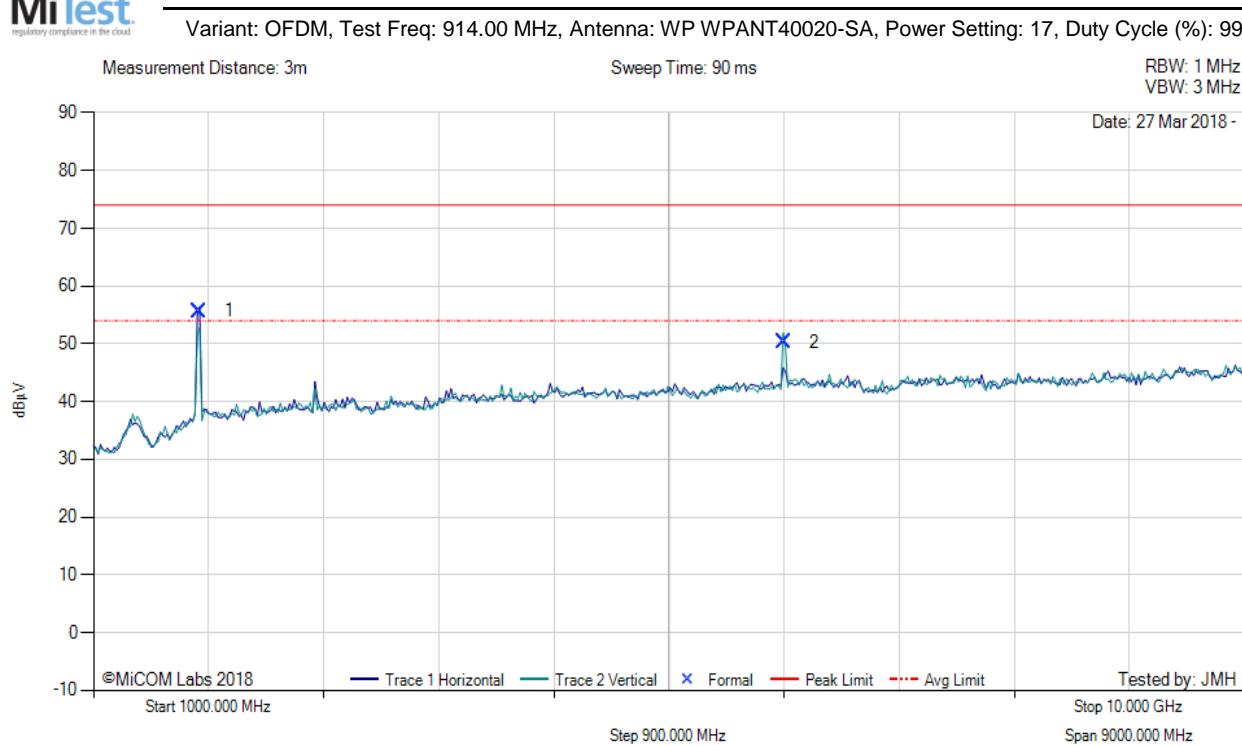
Test Notes: EUT powered by 4 volt DC,

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



TX SPURIOUS & RESTRICTED BAND EMISSIONS



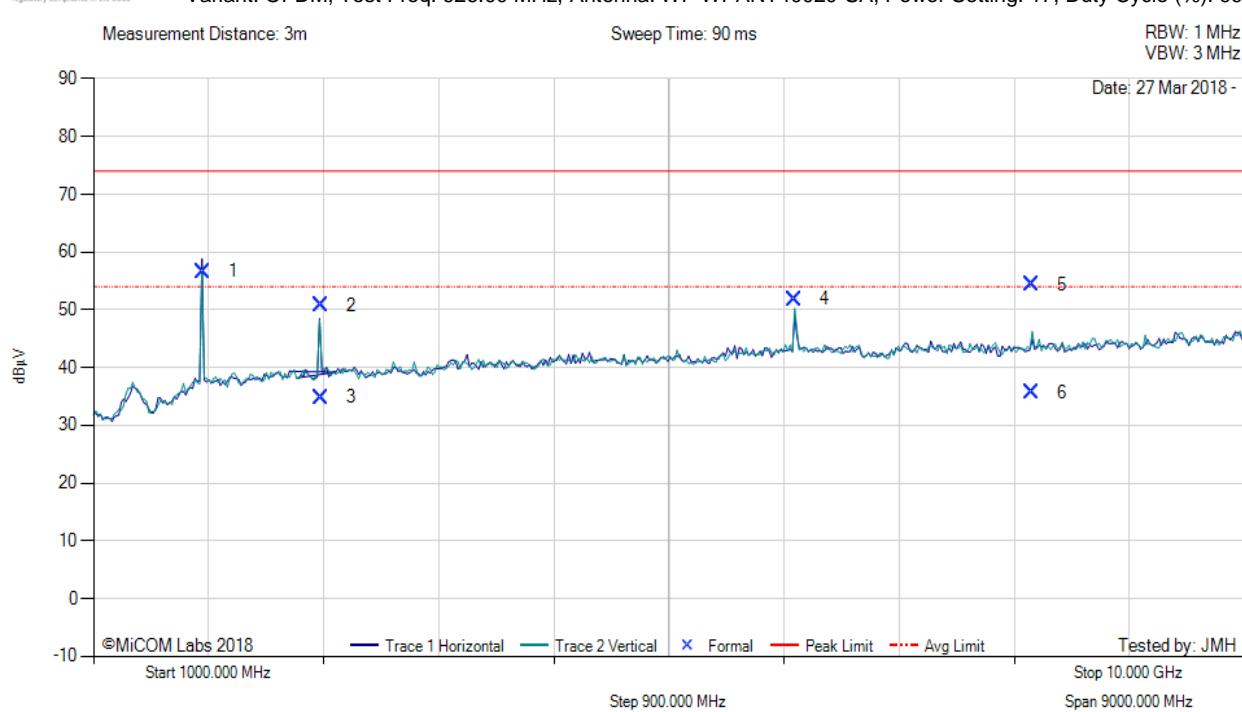
1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
1	1827.96	67.69	2.02	-14.07	55.64	Peak (NRB)	Horizontal	100	167	--	--	Pass	
2	6397.50	56.32	3.21	-9.23	50.30	Peak (NRB)	Vertical	100	167	--	--	Pass	

Test Notes: EUT powered by 4 volt DC,

[back to matrix](#)



TX SPURIOUS & RESTRICTED BAND EMISSIONS



1000.00 - 10000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
1	1852.03	68.39	2.02	-13.81	56.60	Peak (NRB)	Horizontal	100	196	--	--	Pass	
2	2777.94	60.31	2.40	-12.02	50.69	Max Peak	Horizontal	101	137	74.0	-23.3	Pass	
3	2777.94	44.48	2.40	-12.02	34.86	Max Avg	Horizontal	101	137	54.0	-19.1	Pass	
4	6480.71	57.61	3.14	-8.92	51.83	Peak (NRB)	Vertical	100	0	--	--	Pass	
5	8334.11	58.48	3.98	-8.16	54.30	Max Peak	Vertical	181	187	74.0	-19.7	Pass	
6	8334.11	39.82	3.98	-8.16	35.64	Max Avg	Vertical	181	187	54.0	-18.4	Pass	

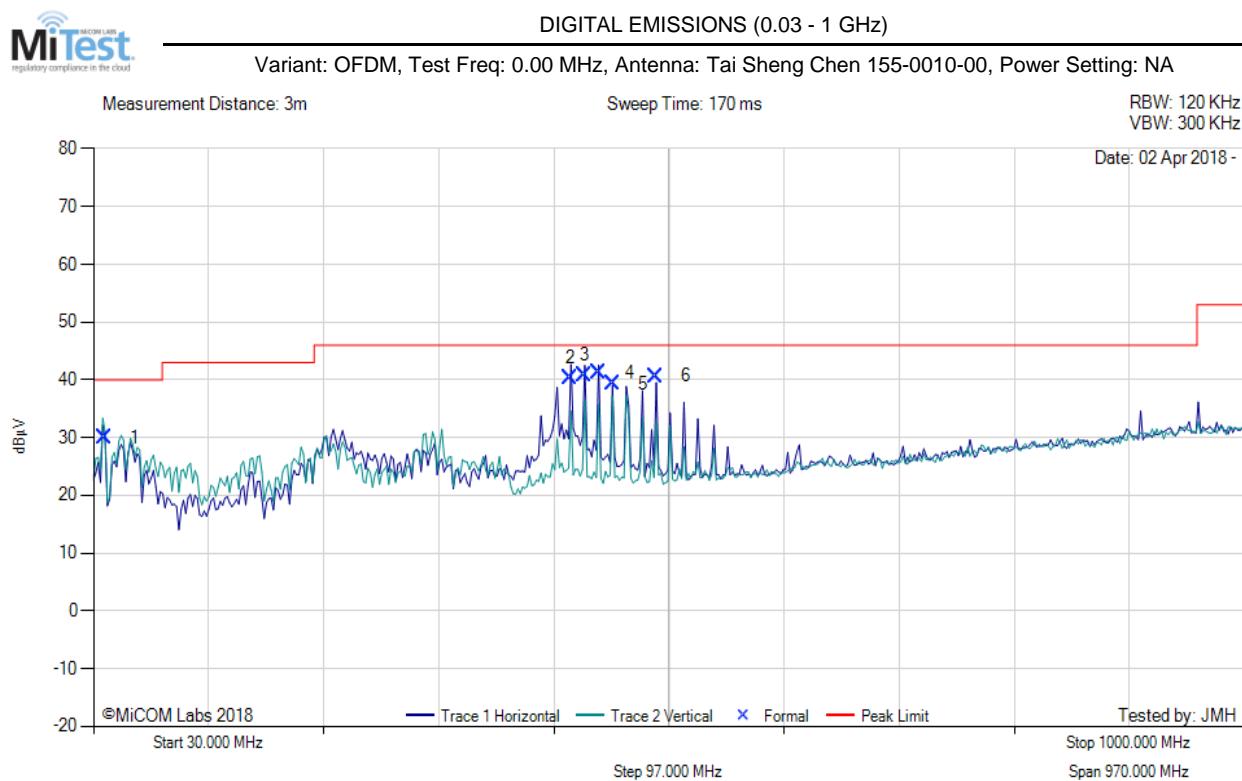
Test Notes: EUT powered by 4 volt DC,

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

A.3.3. Digital Emissions (0.03 - 1 GHz)

USB Active and downloading, Connected to SBC computer



30.00 - 1000.00 MHz													
Num	Frequency MHz	Raw dB μ V	Cable Loss dB	AF dB	Level dB μ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB μ V/m	Margin dB	Pass /Fail	
1	39.02	43.91	3.47	-17.37	30.01	MaxQP	Vertical	104	71	40.0	-10.0	Pass	
2	431.96	49.59	4.99	-14.31	40.27	MaxQP	Horizontal	204	154	46.0	-5.7	Pass	
3	443.99	49.98	5.02	-14.21	40.79	MaxQP	Horizontal	101	356	46.0	-5.2	Pass	
4	456.01	50.18	5.04	-13.93	41.29	MaxQP	Horizontal	282	349	46.0	-4.7	Pass	
5	468.02	47.67	5.07	-13.37	39.37	MaxQP	Horizontal	101	301	46.0	-6.6	Pass	
6	503.99	48.65	5.20	-13.23	40.62	MaxQP	Horizontal	159	160	46.0	-5.4	Pass	

Test Notes: Powered by AC/DC PS. Digital Communications over USB. Connected to SBC.

[back to matrix](#)

RADIATED DIGITAL EMISSIONS

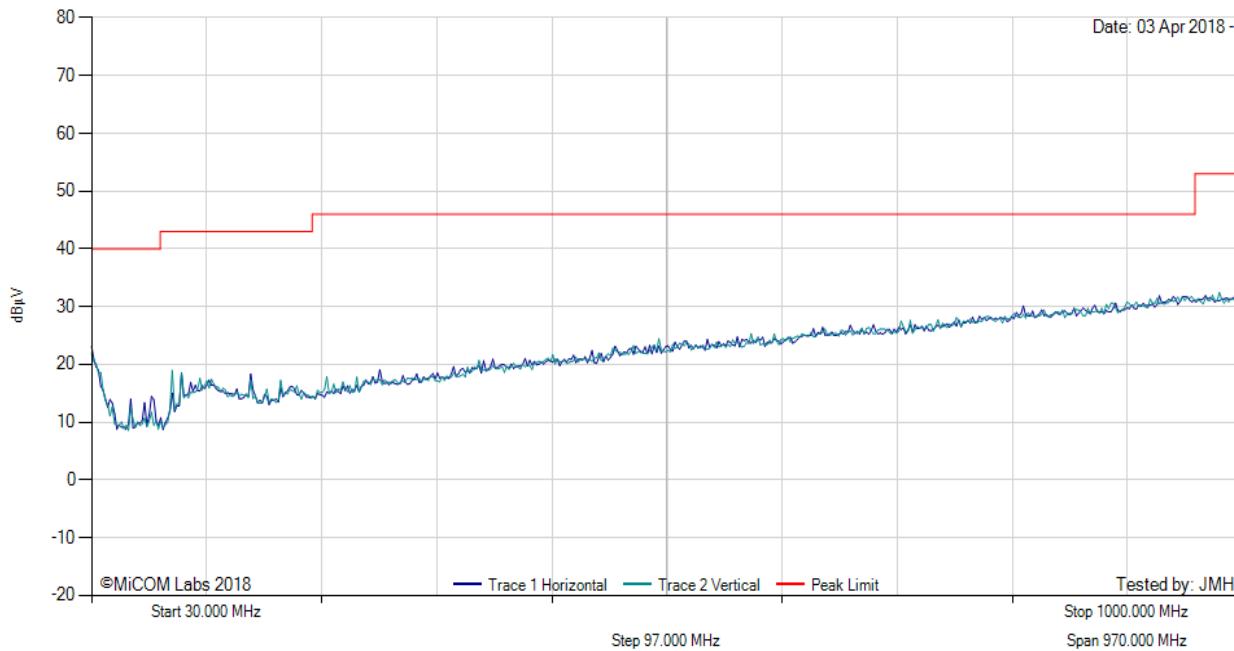


Variant: FHSS, Test Freq: 915.2 MHz, Antenna: Tai Sheng Chen 155-0010-00, Power Setting: NA, Duty Cycle (%): 99

Measurement Distance: 3m

Sweep Time: 170 ms

RBW: 120 KHz
VBW: 300 KHz



There are no emissions found within 6dB of the limit line.

Test Notes: EUT powered by 4V DC. Receiver Emissions

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



575 Boulder Court
Pleasanton, California 94566, USA
Tel: +1 (925) 462 0304
Fax: +1 (925) 462 0306
www.micomlabs.com